Performance Assessment

INCLUDES

- Unit Performance Tasks
- Teacher's Directions and Scoring Rubrics
- Sample Student Responses
- Management Forms

HARCOURT

Math

HARCOURT

Math

Performance Assessment

Grade 6

Harcourt

Orlando Austin Chicago New York Toronto London San Diego

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Performance Assessment Program

Unique Features of Harcourt Math Performance Assessment

To create assessments that actually evaluate what is taught, it is necessary to target specific math concepts, skills, and strategies at each grade level. In planning the assessment program for *Harcourt Math,* a review was made of performance assessments cited in professional literature and also of those used in state testing programs. Comparisons were made among available models and desirable features were identified. Holistic scoring was chosen as the primary method of scoring. The *Harcourt Math* Performance assessments offer the following features:

- **They model good instruction.**
  The assessments are like mini-lessons.
- **They are diagnostic.**
  By reviewing students' notes, teachers gain valuable insight into the thinking strategies that students are using.
- **They encourage the thinking process.**
  The assessments guide students through the process of organizing their thoughts and revising their strategies as they solve problems.
- **They are flexible.**
  No strict time limits are imposed, and students are encouraged to proceed at their own pace.
- **They use authentic instruction.**
  Each task is based on realistic problem-solving situations.
- **They are scored holistically.**
  Responses are scored by a multi-dimensional rubic to provide a comprehensive view of each student's performance.

Development of the Performance Assessment Program

Each assessment was field-tested with students before it was selected for inclusion in the program. After the assessments were selected, the pool of student papers for each assessment was reviewed and model papers were selected to illustrate the various scores. Annotations were then written for each model paper, explaining why the score was given.

The development process provided an opportunity to drop or correct those assessments that were not working as expected.

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Administering the Performance Assessments

- **Be encouraging.**
  Your role in administering the assessments should be that of a coach—motivating, guiding, and encouraging students to produce their best work.
- **Be clear.**
  The directions for the assessments are not standardized. If necessary, you may rephrase them for students.
- **Be supportive.**
  You may assist students who need help. The amount of assistance needed will vary depending on the needs and abilities of your students.
- **Be fair.**
  Allow students adequate time to do their best work. They should not feel that they could have done better if they had been given more time.
- **Be flexible.**
  All students need not proceed through the assessments at the same rate and in the same manner.
- **Be involving.**
  Whenever possible, involve students in the evaluation process.

Providing for Students with Special Needs

Many school districts are facing the challenge of adapting instruction and assessment to make them appropriate for their learners with special needs. Because the performance assessments are not standardized, the procedure for administering them can be adjusted to meet the needs of these learners. Teachers can help students who have difficulty responding by

- pairing a less proficient learner with a more proficient learner.
- encouraging students to discuss their ideas with a partner.
- providing an audiotape of the performance assessment and having students read along with the narration.
- permitting students to tape record their responses in place of writing them.
- allowing students to do their initial planning, computing, designing, and drafting on the computer.
- giving students extra time to do their planning.
- providing assistance upon request.

Keep in mind, however, that the more the performance assessments are modified, the less reliable they may be as measures of students' mathematical ability.

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Scoring Rubrics for Mathematics

In scoring a student's task, the teacher should ask two questions: *How well did the student use the conventions of mathematics to arrive at a solution?* and *How well did the student communicate the solution?* The scoring system used for the performance assessments is designed to be compatible with those used by many state assessment programs. Using a 4-point scale, the teacher classifies the student's performance as "excellent," "adequate," "limited," or "little or no achievement."

4-Point Scale			
Excellent Achievement	Adequate Achievement	Limited Achievement	Little or No Achievement
3	2	1	0

A **Level 3** paper shows evidence of extensive understanding of content and provides an exceptionally clear and effective solution. A **Level 2** paper shows an acceptable understanding of content and provides a solution that shows reasonable insight. A **Level 1** paper shows partial understanding and is clear in some parts, but not in others. A **Level 0** paper demonstrates poor understanding of content and provides a solution that is unclear.

Sharing Results with Students and Families

The performance assessment can provide valuable insights into students' mathematical abilities by revealing how all students performed on a common task. However, it is important that their performance on the assessment be interpreted in light of other samples that have been collected such as daily papers, student portfolios, and other types of tests, as well as teacher observation.

For Students

Discuss the rubric with students and explain how it will be used. You may even want to score some anonymous papers as a group or have students score each other's papers and discuss the criteria as they apply to those papers. Make photocopies of the rubrics to use for individual reports. Discuss the reports in conferences with students, pointing out their strengths as well as areas in which they could still improve.

For Families

Results of performance assessments may also be shared with families, who will appreciate seeing what their children can do. Show family members the performance assessment so they understand the task the students were asked to perform. Show their child's responses and discuss the strengths and weaknesses of the responses. Explain the scoring rubric and how the responses were evaluated. Show model papers that illustrate the range in student performance to help them put their child's paper in perspective.

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Using Results to Assign Grades

No single test, whether a standardized achievement test, a performance assessment, or an open-ended test, can fully measure a student's mathematical ability. For this reason it is important to use multiple measures of assessment. Therefore, a score on performance assessment should not be used as the sole determiner of a report-card grade or semester grade. The performance assessment could represent one of several factors used to determine a student's grade. Assessments could be combined with the results of a selection of tests, daily grades, class participation, self-reflections, and various samples collected in a portfolio. The following table shows how holistic scores can be converted into numerical or letter grades.

Holistic Score	Letter Grade	Numerical Grade
3	A	90-100
2	B	80-89
1	C	70-79
0	D-F	60 or below

Developing Your Own Rubric

A well-written rubric can help teachers score students' work more accurately and fairly. It also gives students a better idea of what qualities their work should exhibit. Using performance assessment to make connections between teaching and learning requires both conceptual and reflective involvement. Determining criteria may be the most difficult aspect of the process of developing assessment criteria on which to evaluate students' performance. Particularly challenging is the task of finding the right language to describe the qualities of student performance that distinguishes mediocre and excellent work. Teachers should begin the process of developing rubrics by

- gathering sample rubrics as models to be adapted as needed.
- selecting samples of students' work that represent a range of quality.
- determining the qualities of work that distinguish good examples from poor examples.
- using those qualities to write descriptors for the desired characteristics.
- continually revising the criteria until the rubric score reflects the quality of work indicated.

To develop your own rubric, you may wish to use a format similar to the models on the next two pages.

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Your Own **Scoring Rubric**

Response Level	Performance Indicators
Score 3	Generally accurate, complete, and clear _____ _____ _____ _____
Score 2	Partially accurate, complete, and clear _____ _____ _____ _____
Score 1	Minimally accurate, complete, and clear _____ _____ _____ _____
Score 0	Not accurate, complete, and clear _____ _____ _____ _____

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Harcourt Math **Scoring Rubric**

Response Level	Levels of Performance
Score 3	**Generally accurate, complete, and clear** _____ All or most parts of the task are successfully completed; the intents of all parts of the task are addressed with appropriate strategies and procedures. _____ There is evidence that the student has a clear understanding of key concepts and procedures. _____ Student work and explanations are clear. _____ Additional illustrations or information, if present, enhance communication. _____ Answers for all parts are correct or reasonable.
Score 2	**Partially accurate, complete, and clear** _____ Some parts of the task are successfully completed; other parts are attempted and their intents addressed, but they are not successfully completed. _____ There is evidence that the student has partial understanding of key concepts and procedures. _____ Some student work and explanations are clear, but it is necessary to make inferences to understand the response. _____ Additional illustrations or information, if present, may not enhance communication significantly. _____ Answers for some parts are correct, but partially correct or incorrect for others.
Score 1	**Minimally accurate, complete, and clear** _____ A part (or parts) of the task is (are) addressed with minimal success while other parts are omitted or incorrect. _____ There is minimal or limited evidence that the student understands concepts and procedures. _____ Student work and explanations may be difficult to follow, and it is necessary to fill in the gaps to understand the response. _____ Additional illustrations or information, if present, do not enhance communication and may be irrelevant. _____ Answers to most parts are incorrect.
Score 0	**Not accurate, complete, and clear** _____ No part of the task is completed with any success. _____ There is little, if any, evidence that the student understands key concepts and procedures. _____ Student work and explanations are very difficult to follow and may be incomprehensible. _____ Any additional illustrations, if present, do not enhance communication and are irrelevant. _____ Answers to all parts are incorrect.

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Performance Assessment

Class Record Form

School	Unit 1		Unit 2		Unit 3		Unit 4		Unit 5	
Teacher	Task A	Task B	Task A	Task B	Task A	Task B	Task A	Task B	Task A	Task B
NAMES Date										

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Performance Assessment

Class Record Form

School	Unit 6		Unit 7		Unit 8		Unit 9	
Teacher	Task A	Task B	Task A	Task B	Task A	Task B	Task A	Task B
NAMES Date								

TASK A

Programming Problem

Purpose
To assess student understanding of order of operations

Time
10–15 minutes

Grouping
Individuals or partners

Preparation Hints
Review the order of operations before students begin.

Introduce the Task
Students use order of operations to evaluate expressions in the context of writing a computer program. They use operations with whole numbers and decimals as well as exhibit an understanding of order of operations.

TASK B

Pizza Party

Purpose
To assess student understanding of problem solving

Time
10–15 minutes

Grouping
Partners or small groups

Introduce the Task
Students solve a problem about planning a party in which they can organize their information by making a list. They must consider several possible solutions and come up with the one that best fits the problem situation.

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Name _____ Date _____

TASK A

Programming Problem

Performance Indicators	Observations and Rubric Score
_____ Determines the steps a computer must go through to evaluate any expression put into it. _____ Makes up a numerical expression that includes three different operations and explains how the computer will evaluate it. _____ Explains how a computer will evaluate a particular expression. _____ Shows work and explains how the answers were determined.	3 2 1 0

TASK B

Pizza Party

Performance Indicators	Observations and Rubric Score
_____ Shows understanding of possible ways to spend money on pizza by making a list or table of the information. _____ Uses information about pizza purchase to determine how many people to invite to a party. _____ Determines how much pizza to buy, staying within an established budget. _____ Shows work and explains how the answers were determined.	3 2 1 0

Total Score _____ /6

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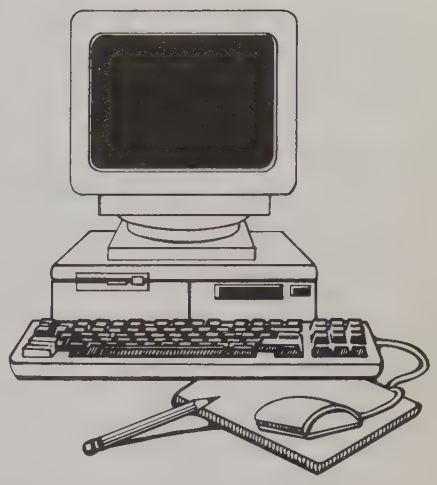
Programming Problem

As part of a larger computer program you are building, you need to make a module that will evaluate any numerical expression the user puts into it.



- Write down the steps the computer must go through to evaluate any expression that is put into it.

_____

_____

- Make up your own numerical expression that includes at least three different operations and has part of the expression in parentheses. Explain the steps the computer will go through to evaluate it.

_____

_____

- Tell how the computer will evaluate the following expression:

  $3 \times 0.2 + 9 \div 0.3 - (4^2 - 2^3)$

_____

_____

Show your work.

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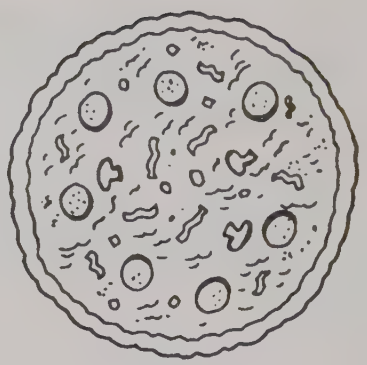
Name _____

Pizza Party

Peggy is giving a pizza party to celebrate her birthday. To plan it she needs some information about the pizzas she can order.



Pizza Diameter	Number of Slices	Cost per Pizza
12 inches	4	$ 7
14 inches	6	$ 9
16 inches	8	$ 11

- Suppose Peggy has $30 to spend on the pizzas. What are some different ways to spend the money? Make a list. Which way gets her closest to spending all of the $30? What combination of pizzas should she buy to get the greatest number of slices?

_____

_____

_____

Next, she'll have to decide how many friends she can invite.

- How many slices do you think a typical friend will have? Find a way for Peggy to order exactly enough pizzas so that each friend gets the same number of slices and none are left over. Describe what you would do. Remember to stay within the budget.

Show your work.

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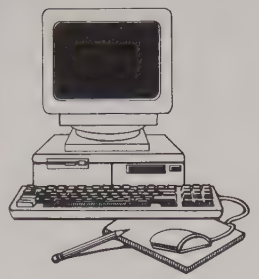
Name _____ UNIT 1 • TASK A

Programming Problem

As part of a larger computer program you are building, you need to make a module that will evaluate any numerical expression the user puts into it.



- Write down the steps the computer must go through to evaluate any expression that is put into it. The computer must follow the order of operations:
  - Evaluate the expressions within parentheses.
  - Evaluate the exponents.
  - Multiply and divide from left to right.
  - Add and subtract from left to right.

- Make up your own numerical expression that includes at least three different operations and has part of the expression in parentheses. Explain the steps the computer will go through to evaluate it.

Students' expressions should involve three different operations, such as addition, subtraction, multiplication, and division, and may include exponents or parentheses. Their explanation of how to evaluate their expression should follow the order of operations outlined above.

- Tell how the computer will evaluate the following expression: The computer will follow the order of operations. In this case, evaluating the expressions within the parentheses will also evaluate the exponents.

$3 \times 0.2 + 9 \div 0.3 - (4^2 - 2^3)$

Evaluate expressions within parentheses.

Multiply and divide from left to right. First multiply 3×0.2 and then divide $9 \div 0.3$.

Add and divide from left to right. Add $0.6 + 30$ and subtract 8 from that sum.

Show your work. $3 \times 0.2 + 9 \div 0.3 - (4^2 - 2^3)$

$= 3 \times 0.2 + 9 \div 0.3 - (16 - 8)$
$= 3 \times 0.2 + 9 \div 0.3 - 8$
$= 0.6 + 30 - 8$
$= 22.6$

Name _____ UNIT 1 • TASK B

Pizza Party

Peggy is giving a pizza party to celebrate her birthday. To plan it she needs some information about the pizzas she can order.

Pizza Diameter	Number of Slices	Cost per Pizza
12 inches	4	$ 7
14 inches	6	$ 9
16 inches	8	$ 11

- Suppose Peggy has $30 to spend on the pizzas. What are some different ways to spend the money? Make a list. Which way gets her closest to spending all of the $30? What combination of pizzas should she buy to get the greatest number of slices?

Students can make a list or a table to show the possible combinations. Their list might look like this:

Pizzas	Total slices	Total cost
4 12-inch	16	$28
3 14-inch	18	$27
2 16-inch	16	$22
2 16-inch, 1 14-inch	22	$31
2 16-inch, 1 12-inch	20	$29
2 14-inch, 1 16-inch	20	$29
3 12-inch, 1 16-inch	20	$32

Next, she'll have to decide how many friends she can invite.

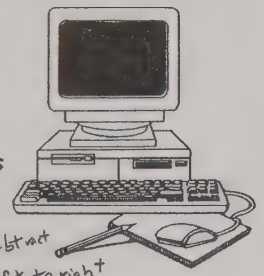
- How many slices do you think a typical friend will have? Find a way for Peggy to order exactly enough pizzas so that each friend gets the same number of slices and none are left over. Describe what you would do. Remember to stay within the budget. From their list or table, they should conclude that the maximum number of pieces she can get is 20 if she stays within her budget. Students may answer that they would use the factors of 20 to determine the number of friends to invite: 10 would get 2 pieces, 5 would get 4 pieces, and so on. Be sure students show their work and justify their answers.

Show your work.

Name _____ UNIT 1 • TASK A

Programming Problem

As part of a larger computer program you are building, you need to make a module that will evaluate any numerical expression the user puts into it.



- Write down the steps the computer must go through to evaluate any expression that is put into it. math order of operations - PEMDAS

First do math inside parenthises, then solve exponints, the mult/div left to right, last add/subtract left to right

- Make up your own numerical expression that includes at least three different operations and has part of the expression in parentheses. Explain the steps the computer will go through to evaluate it.

$3 \div 3 + 3 \times (3^3 - 3)$: First do math in ( ), then do $3 \div 3$, then $3 \times$ ( ), last add the two things together $3 \div 3 + 3 \times (3^3 - 3)$

- Tell how the computer will evaluate the following expression.

$3 \times 0.2 + 9 \div 0.3 - (4^2 - 2^3)$

0.6 30 16 − 8 = 8

$3 \div 3 + 3 \times 24$ 27 − 3

$1 + 72 = \boxed{73}$

First math in ( ), then 3×0.2, then $9 \div 0.3$, then add and then subtract -

Show your work.

$0.2 \times 3 = 0.6$

$0.3 \overline{)90.}$ 30.

$16 - 8 = 8$

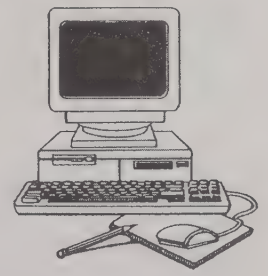
$0.6 + 30 - 8 = 22.6$

Level 3 Student's work is complete and accurate. Student displays good understanding of the task. Work shows understanding of order of operations. Work is complete and accurate.

Name _____ UNIT 1 • TASK A

Programming Problem

As part of a larger computer program you are building, you need to make a module that will evaluate any numerical expression the user puts into it.



- Write down the steps the computer must go through to evaluate any expression that is put into it.

Well, it would just go by this phrase: PEMDAS

- Make up your own numerical expression that includes at least three different operations and has part of the expression in parentheses. Explain the steps the computer will go through to evaluate it.

$3^4 \div 9(6 \times 5^2) - 53$ You would do perenthsie's, then the 3^4, then 9( ), then $3^4 \div 9$( ), then subtract

- Tell how the computer will evaluate the following expression.

$3 \times 0.2 + 9 \div 0.3 - (4^2 - 2^3)$

perenthesies 1st

Show your work.

Perenthsie's then exponents then multiplication & division then addition & subtraction

Level 2 Overall the work is partially complete. The student answers first and second parts adequately, but third part is mostly ignored.

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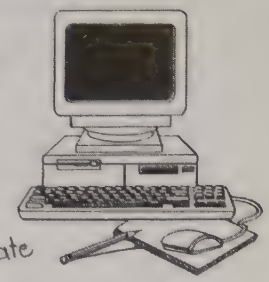
Name _____ UNIT 1 • TASK A

Programming Problem

As part of a larger computer program you are building, you need to make a module that will evaluate any numerical expression the user puts into it.



- Write down the steps the computer must go through to evaluate any expression that is put into it.

IT WOULD FIRST HAVE TO BREAK THE EXPRESSION DOWN. THEN EVAluate THE EXPRESSION.

- Make up your own numerical expression that includes at least three different operations and has part of the expression in parentheses. Explain the steps the computer will go through to evaluate it.

3X4(5+25)÷43= FIRST THE COMPUTER WOULD DO THE MATH PROBLEM THAT ARE IN PREinthons. THEN IT WOULD DO THE Timings and then THE Divison.

- Tell how the computer will evaluate the following expression.

$3 \times 0.2 + 9 \div 0.3 - (4^2 - 2^3)$

IT WOULD DO $4^2 - 2^3 = 16$ THEN $3 \times 0.2 = 0.6$ THEN $0.6 + 16 = 16.6$ THEN $16.6 + 9 = 256$ LAST $256 \div 0.3 = 35$.

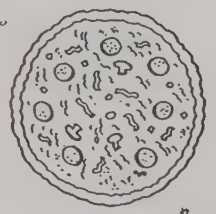
Show your work.

Level 1 This is generally a weak paper. The explanation in the first part is not helpful. The second part is correctly stated. The third part shows little understanding of operations.

Name _____ UNIT 1 • TASK B

Pizza Party

Peggy is giving a pizza party to celebrate her birthday. To plan it she needs some information about the pizzas she can order.



Pizza Diameter	Number of Slices	Cost per Pizza
12 inches	4	$7
14 inches	6	$9
16 inches	8	$11

4 x 12 in = $28 16 slices
3 x 14 in = $27 18 slices

- Suppose Peggy has $30 to spend on the pizzas. What are some different ways to spend the money? Make a list. Which way gets her closest to spending all of the $30? What combination of pizzas should she buy to get the greatest number of slices? 2 x 16 in + 1 x 12 in = 22 + 7 = $29 20 slices

2 x 14 in + 1 x 16 in = 18 + 11 = $29 20 slices
2 x 16 in + 1 x 14 in = 22 + 9 = $31 22 slices

She could buy either two 16 inch + 1 12 inch pizzas or two 14 inch + 1 16 inch. Either way she spends $29 and gets 20 slices.

Next, she'll have to decide how many friends she can invite.

- How many slices do you think a typical friend will have? Find a way for Peggy to order exactly enough pizzas so that each friend gets the same number of slices and none are left over. Describe what you would do. Remember to stay within the budget. Well if she has 20 slices, the less friends she invites the more pizza they can all have.

Show your work. I think she should ask 4 friends plus her. Each can have 4 slices. If her friends don't eat much, she could ask 9 of them for 2 each.

Level 3 The student shows clear understanding of the task. All steps are addressed. Answers are correct, and logical reasoning is evident.

Name _____ UNIT 1 • TASK B

Pizza Party

Peggy is giving a pizza party to celebrate her birthday. To plan it she needs some information about the pizzas she can order.

Pizza Diameter	Number of Slices	Cost per Pizza
12 inches	4	$7
14 inches	6	$9
16 inches	8	$11

2:00

- Suppose Peggy has $30 to spend on the pizzas. What are some different ways to spend the money? Make a list. Which way gets her closest to spending all of the $30? What combination of pizzas should she buy to get the greatest number of slices?

By spending all the money or just about she could buy of each combination 16 inch + 1 12 inch, 16 inch + 2 14 inch, or 3 12 inch + 1 14 inch.

Next, she'll have to decide how many friends she can invite.

- How many slices do you think a typical friend will have? Find a way for Peggy to order exactly enough pizzas so that each friend gets the same number of slices and none are left over. Describe what you would do. Remember to stay within the budget.

Show your work. She can invite 9 friends over and each friend would have 2 slices a piece.

Level 2 In the first part of this task, the student gives three combinations but does not address maximizing the slices. In the second part, there is a logical answer but it is not explained.

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Name _____

Pizza Party

Peggy is giving a pizza party to celebrate her birthday. To plan it she needs some information about the pizzas she can order.

Pizza Diameter	Number of Slices	Cost per Pizza
12 inches	4	$7
14 inches	6	$9
16 inches	8	$11

- Suppose Peggy has $30 to spend on the pizzas. What are some different ways to spend the money? Make a list. Which way gets her closest to spending all of the $30? What combination of pizzas should she buy to get the greatest number of slices?

SHE WOULD WANT TO GET TWO 14 INCH PIZZAS AND THEN ONE 16 INCH. SHE WOULD SPEND $29

Next, she'll have to decide how many friends she can invite.

- How many slices do you think a typical friend will have? Find a way for Peggy to order exactly enough pizzas so that each friend gets the same number of slices and none are left over. Describe what you would do. Remember to stay within the budget.

Show your work.

Level 1 The thinking on finding the greatest number of slices and staying within the budget is clear, but the rest of this work is incomplete.

TASK A

Too Much Homework?

Purpose
To assess students' understanding of mean, median, and mode

Time
10–15 minutes

Grouping
Individuals or partners

Preparation Hints
Review the meanings of mean, median, and mode and how to calculate each measure.

Introduce the Task
It is important that students understand how mean, median, and mode are used and which is the most appropriate measure of central tendency in a given situation. In this task, students consider the case of homework and try to determine which measure is the best one to use to describe the amount of homework they have to do. They will need to be able to calculate mean, median, and mode.

TASK B

Graph Analysis

Purpose
To assess students' understanding of graphs and what they show

Time
10–15 minutes

Grouping
Partners or small groups

Preparation Hints
Review different kinds of graphs and how each type shows information.

Introduce the Task
This task asks students to graph data provided as well as to use it to prepare a table and another type of graph. They will need to know how to make graphs and how to determine what a given graph shows.

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Name _____ Date _____

TASK A Too Much Homework?

Performance Indicators	Observations and Rubric Score
_____ Determines the mean, median, and mode of a given group of numbers. _____ Interprets the mean, median, and mode for a specific problem and determines which best describes the data for the given purposes. _____ Explains how to choose whether to use mean, median, or mode in a given problem. _____ Shows work and explains how the answers were determined.	3 2 1 0

TASK B Graph Analysis

Performance Indicators	Observations and Rubric Score
_____ Constructs and describes a graph. _____ Uses data to make a table. _____ Writes a question that can be answered by looking at a specific graph.	3 2 1 0

Total Score _____/6

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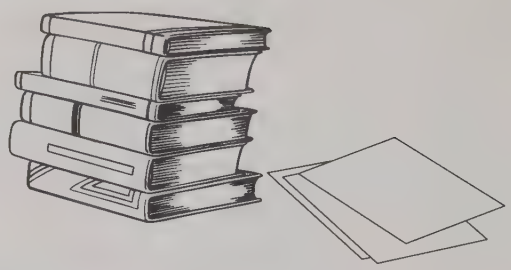
Too Much Homework?



For homework, Scott has 3 social studies questions, 3 English questions, 2 science problems, 5 Spanish questions, and 20 math exercises. Scott's friend Beth asks him about how much homework he has in each subject. Would he give the mean, median, or mode of the number of problems to make his homework assignment seem as long as possible?

- Explain your choice. Write down your thinking as you make your decision.
- Suppose your friend asks you the same question about the homework you really have. How would you respond?

Show your work.

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Graph Analysis

Elements in the Earth's Crust: Aluminum 8.1%, Calcium 3.6%, Iron 5.0%, Oxygen 46.6%, Silicon 27.7%, All Others 9.0%

a. Organize the data in a table. Then use the data to make a graph. Then write a short description of the graph. Include the following:

- What the title and axes represent
- What the parts represent, if it is a circle graph
- What stands out as important or obvious

b. Describe how the data can be used to make a different kind of graph.

c. Write a question that can be answered from either graph.

Show your work.

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Name _____ UNIT 2 • TASK A

Too Much Homework?

For homework, Scott has 3 social studies questions, 3 English questions, 2 science problems, 5 Spanish questions, and 20 math exercises. Scott's friend Beth asks him about how much homework he has in each subject. Would he give the mean, median, or mode of the number of problems to make his homework assignment seem as long as possible?

- Explain your choice. Write down your thinking as you make your decision.
- Suppose your friend asks you the same question about the homework you really have. How would you respond?

Show your work. Students should begin by determining the mean, median, and mode of the given data.

Mean: (3 + 3 + 2 + 5 + 20) : 5 = 6.6

Median: 3

Mode: 3

Students may select the mean because it is the greatest number and probably best takes into account the larger number of math problems. However, some may select the median, arguing that it is the middle number and therefore the best. Students who choose the mode should reason that it is the most common number of problems given.

Students' answers on the second part may vary. They may argue that they would prefer to find the mean or median number of hours they need to spend on their homework rather than the mean or median of the number of problems. For example, 2 science problems could take longer than the math problems if those were simple computation. Students' answers should reflect understanding of what the mean, median, and mode tell us about the data.

Name _____ UNIT 2 • TASK B

Graph Analysis

Elements in the Earth's Crust: Aluminum 8.1%, Calcium 3.6%, Iron 5.0%, Oxygen 46.6%, Silicon 27.7%, All Others 9.0%

a. Organize the data in a table. Then use the data to make a graph. Then write a short description of the graph. Include the following:

- What the title and axes represent
- What the parts represent, if it is a circle graph
- What stands out as important or obvious

b. Describe how the data can be used to make a different kind of graph.

c. Write a question that can be answered from either graph.

Show your work.

Students' answers to the first part of the task will vary, depending on the type of graph they have selected. Graphs should be given a title. Their description of the graph should reflect their understanding of the types of graphs and what they are used to show.

Students should list the elements in order in the table, either from least to greatest percentage or from greatest to least. As students select the second graph, their work should show understanding of the fact that a circle graph must show parts of a whole. It may not be appropriate for all kinds of situations. Even though a line graph is used only in specific situations showing change, most bar graphs can be redone as line graphs and vice versa.

Check students' questions to be sure they reflect understanding of the data in the graph. Students should supply justifications for their questions in each case.

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Model Student Papers for
Too Much Homework?
UNIT 2 • TASK A

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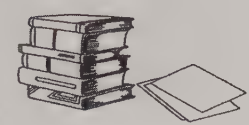
Name _____ UNIT 2 • TASK A

Too Much Homework?

For homework, Scott has 3 social studies questions, 3 English questions, 2 science problems, 5 Spanish questions, and 20 math exercises. Scott's friend Beth asks him about how much homework he has in each subject. Would he give the mean, median, or mode of the number of problems to make his homework assignment seem as long as possible?



- Explain your choice. Write down your thinking as you make your decision.
- Suppose your friend asks you the same question about the homework you really have. How would you respond?

Show your work.

mean 20 + 13 = 33

$$\begin{array}{r} 6.6 \\ 5\overline{)33.0} \\ 30 \\ \hline 30 \\ 30 \end{array}$$

mean is $\boxed{6.6}$

mode occurs most - $\boxed{3}$ median 2 3 $\boxed{3}$ 5 20

Scott would give the mean because its the biggest number. Its the average # of items for a subject.

$$\begin{array}{r} 13.6 \\ 3\overline{)41.0} \\ 3 \\ \hline 11 \\ 9 \\ \hline 20 \\ 18 \end{array}$$

I have English, Math, Social St.
6 questions 25 q. 10 names & dates

I could say the mean of 13.6 because its bigger than 6 & 10. The middle number is 10 and that's big too.

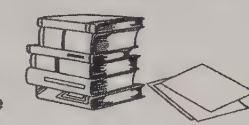
I could time myself for each subject and get the mean minutes.

Level 3 This student shows excellent understanding of mean, median, and mode. Answers are accurate and complete.

Name _____ UNIT 2 • TASK A

Too Much Homework?

For homework, Scott has 3 social studies questions, 3 English questions, 2 science problems, 5 Spanish questions, and 20 math exercises. Scott's friend Beth asks him about how much homework he has in each subject. Would he give the mean, median, or mode of the number of problems to make his homework assignment seem as long as possible?



- Explain your choice. Write down your thinking as you make your decision.
- Suppose your friend asks you the same question about the homework you really have. How would you respond?

Show your work.

1. 3
3
2
5
20
33

$$\begin{array}{r} 6.6 \\ 5\overline{)33.0} \\ 30 \\ \hline 30 \end{array}$$

mean 2 3 3 5 20 median 3 mode

2. median is 3. This means two subjects have more than 3 questions.

3. I'd give him the total so it sounds big.

Level 2 Student has correctly determined the mean, median, and mode. The choice for median is justified. The answer to the question is vague and not answered in terms of mean, median, and mode.

Name _____ UNIT 2 • TASK A

Too Much Homework?

For homework, Scott has 3 social studies questions, 3 English questions, 2 science problems, 5 Spanish questions, and 20 math exercises. Scott's friend Beth asks him about how much homework he has in each subject. Would he give the mean, median, or mode of the number of items to make his homework assignment seem as long as possible?

- Explain your choice. Write down your thinking as you make your decision.
- Suppose your friend asks you the same question about the homework you really have. How would you respond?

Show your work.

The mean median mean
16.6 3 3

3
3
2
5
20
33

2
3
3
5
20

16.6
5|33
30
30
30
3

Level 1 This student correctly determines the mean, median, and mode (although mislabeled), but other parts of the task are not completed.

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Name _____ UNIT 2 • TASK B

Graph Analysis

Elements in the Earth's Crust: Aluminum 8.1%, Calcium 3.6%, Iron 5.0%, Oxygen 46.6%, Silicon 27.7%, All Others 9.0%

a. Organize the data in a table. Then use the data to make a graph. Then write a short description of the graph. Include the following:

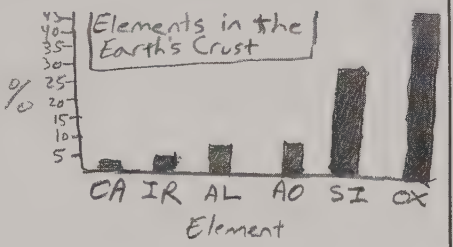
- What the title and axes represent
- What the parts represent, if it is a circle graph
- What stands out as important or obvious

b. Describe how the data can be used to make a different kind of graph.

c. Write a question that can be answered from either graph.

Show your work.

Element	%
Calcium	3.6
Iron	5.0
Aluminum	8.1
All Others	9.0
Silicon	27.7
Oxygen	46.6



The title and axis show how to read the graph. The bars show how much of each element there is. There is more oxygen than anything else.

b) I can divide a circle into pieces. Oxygen would be the biggest piece.

c) Which element is least common in the Earth's crust?

Level 3 Elements are listed in the table in increasing order. Bar graph is a good choice and size of bars is accurate. Student chooses a circle graph as another choice and asks a good question to sum up the activity.

Name _____ UNIT 2 • TASK B

Graph Analysis

Elements in the Earth's Crust: Aluminum 8.1%, Calcium 3.6%, Iron 5.0%, Oxygen 46.6%, Silicon 27.7%, All Others 9.0%

a. Organize the data in a table. Then use the data to make a graph. Then write a short description of the graph. Include the following:

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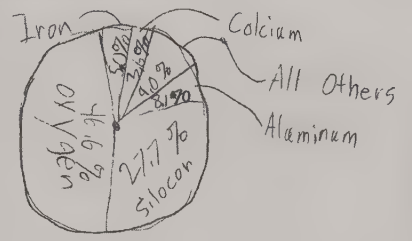
- What stands out as important or obvious

b. Describe how the data can be used to make a different kind of graph.

c. Write a question that can be answered from either graph.

Show your work.



AL	8.1
CA	3.6
IR	5.0
OX	46.6
SI	27.7
ALO	9.0

This graph shows that the Earths crust has more Oxygen than anything elese.

Which Element In Earths Crust more common-Iron or Calcium?

Level 2 Student draws an accurate graph, writes a good explanation and a good question. However, the data in the table is not listed in either ascending or descending order. A second graph is not given.

Name _____

Graph Analysis

Elements in the Earth's Crust: Aluminum 8.1%, Calcium 3.6%, Iron 5.0%, Oxygen 46.6%, Silicon 27.7%, All Others 9.0%

a. Organize the data in a table. Then use the data to make a graph. Then write a short description of the graph. Include the following:

- What the title and axes represent
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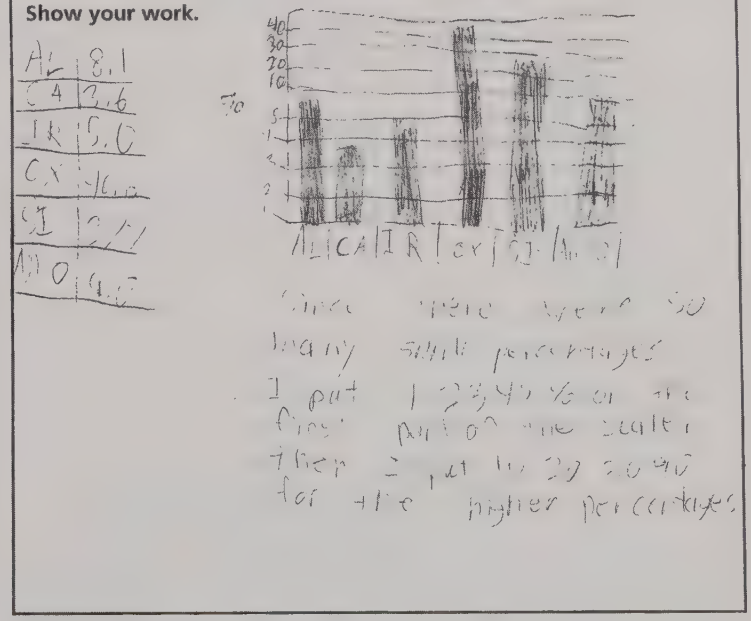
- What stands out as important or obvious

b. Describe how the data can be used to make a different kind of graph.

c. Write a question that can be answered from either graph.

Show your work.



Level 1 The choice of a bar graph is acceptable but intervals cannot be changed in the middle of a problem. The table data is not given in any order. There is not another type of graph, nor is a question posed.

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TASK A

Fraction Fun

Purpose
To assess students' understanding of multiplication of fractions

Time
10–15 minutes

Grouping
Individuals or partners

Introduce the Task
Students learn to find the product of two mixed numbers by writing them as fractions and then using the rule for multiplying fractions. In this task, students explore right and wrong ways to use the Distributive Property to find the product of two mixed numbers. Students must use their skills in multiplying whole numbers and fractions as well as in writing mixed numbers as fractions and fractions as mixed numbers.

TASK B

Pen Pal

Purpose
To assess students' understanding of fractions and fraction-decimal equivalents

Time
10–15 minutes

Grouping
Individuals

Preparation Hints
Review the process of writing a fraction as a decimal.

Introduce the Task
In this task, students write a letter about themselves to an imaginary pen pal. Part of the assignment is to use fractions to describe how they spend their time during the day. In addition, students are asked to write the decimal equivalents of the fractions they give or fraction equivalents of the decimals. Students must be able to use fractions to describe parts of a class, a day, or a week and to write the decimal equivalents of those fractions.

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Name _____ Date _____

TASK A

Fraction Fun

Performance Indicators	Observations and Rubric Score
_____ Finds the product of two mixed numbers using the standard algorithm. _____ Shows understanding of how to use the Distributive Property to find the product of two mixed numbers. _____ Exhibits understanding of the Distributive Property by explaining how it is being used incorrectly in a specific example.	3 2 1 0

TASK B

Pen Pal

Performance Indicators	Observations and Rubric Score
_____ Uses fractions to describe parts of a class, hour, day, or week. _____ Determines the decimal equivalent of a fraction or the fractional equivalent of a decimal. _____ Shows work and explains how the answers were determined.	3 2 1 0

Total Score _____ /6

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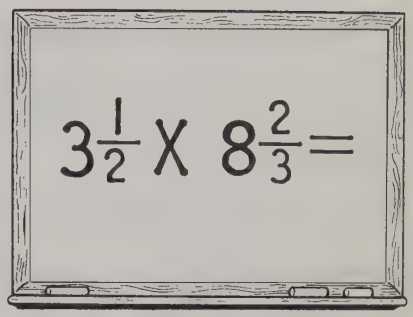
Fraction Fun

Margo finds the product of $3\frac{1}{2}$ and $8\frac{2}{3}$ by writing



each as a fraction and multiplying numerators and denominators.

Chen said he can find the product using the Distributive Property. Here's how he starts:

$3\frac{1}{2} \times 8\frac{2}{3} = (3 + \frac{1}{2}) \times (8 + \frac{2}{3})$

$= 3 \times (8 + \frac{2}{3}) + \frac{1}{2} \times (8 + \frac{2}{3})$

- Finish Chen's solution to find the answer.
- Use Margo's method to find $3\frac{1}{2} \times 8\frac{2}{3}$. Do you get the same answer as with Chen's method?
- Tom said he thinks $(3 + \frac{1}{2}) \times (8 + \frac{2}{3}) = 3 \times 8 + \frac{1}{2} \times \frac{2}{3}$. Is he correct? Explain why or why not.

Show your work.

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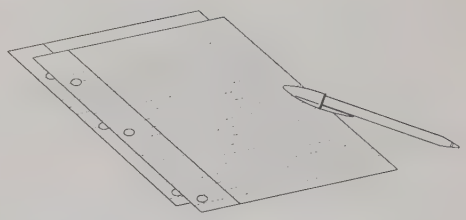
Pen Pal



Assume that you have a pen pal and are going to start writing. This is your first letter. Write a short paragraph describing yourself and your activities.

Include the following in the paragraph:

- How you divide your time during a typical week
- How your school day is divided by classes and other activities
- What you like to do after school

As you write your letter, use fractions or decimals to name parts of classes, hours, days, or weeks. Each time you use a fraction, write the equivalent decimal in parentheses next to it. Do the reverse each time you use a decimal.

Show your work.

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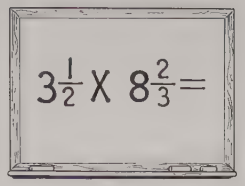
Name _____ UNIT 3 • TASK A

Fraction Fun

Margo finds the product of $3\frac{1}{2}$ and $8\frac{2}{3}$ by writing each as a fraction and multiplying numerators and denominators.



Chen said he can find the product using the Distributive Property. Here's how he starts:

$3\frac{1}{2} \times 8\frac{2}{3} = (3 + \frac{1}{2}) \times (8 + \frac{2}{3})$

$= 3 \times (8 + \frac{2}{3}) + \frac{1}{2} \times (8 + \frac{2}{3})$

- Finish Chen's solution to find the answer.
- Use Margo's method to find $3\frac{1}{2} \times 8\frac{2}{3}$. Do you get the same answer as with Chen's method?
- Tom said he thinks $(3 + \frac{1}{2}) \times (8 + \frac{2}{3}) = 3 \times 8 + \frac{1}{2} \times \frac{2}{3}$. Is he correct? Explain why or why not.

Show your work.

Students should show the following to finish Chen's solution:

$3 \times (8 + \frac{2}{3}) + \frac{1}{2} \times (8 + \frac{2}{3}) = 3 \times 8 + 3 \times \frac{2}{3} + \frac{1}{2} \times 8 + \frac{1}{2} \times \frac{2}{3}$

$= 24 + 2 + 4 + \frac{1}{3}$

$= 30\frac{1}{3}$

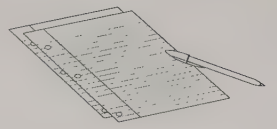
Margo's solution:

$3\frac{1}{2} \times 8\frac{2}{3} = \frac{7}{2} \times \frac{26}{3} = \frac{7}{1} \times \frac{13}{3} = \frac{91}{3} = 30\frac{1}{3}$

Students should see that they get the same solution. The mistake that Tom is making is that 3 must be multiplied by both 8 and $\frac{2}{3}$, as must $\frac{1}{2}$.

Name _____ UNIT 3 • TASK B

Pen Pal



Assume that you have a pen pal and are going to start writing. This is your first letter. Write a short paragraph describing yourself and your activities.

Include the following in the paragraph:

- How you divide your time during a typical week
- How your school day is divided by classes and other activities
- What you like to do after school

As you write your letter, use fractions or decimals to name parts of classes, hours, days, or weeks. Each time you use a fraction, write the equivalent decimal in parentheses next to it. Do the reverse each time you use a decimal.

Show your work.

As students write their letters to their imaginary pen pals, they should think of as many things they do in school or at home every day and estimate the part of a class period, hour, day, or week that they spend on that activity. As they write about these activities, they should add details about their lives as well.

Check their letters for imagination in describing their lives, how well they integrate the use of fractions and decimals, and how accurately they write the decimal equivalents of fractions and fraction equivalents of decimals.

Name _____ UNIT 3 • TASK A

Fraction Fun

Margo finds the product of $3\frac{1}{2}$ and $8\frac{2}{3}$ by writing each as a fraction and multiplying numerators and denominators.

$3\frac{1}{2} \times 8\frac{2}{3} =$

Chen said he can find the product using the Distributive Property. Here's how he starts:

$3\frac{1}{2} \times 8\frac{2}{3} = (3 + \frac{1}{2}) \times (8 + \frac{2}{3})$

$= 3 \times (8 + \frac{2}{3}) + \frac{1}{2} \times (8 + \frac{2}{3})$

- Finish Chen's solution to find the answer.
- Use Margo's method to find $3\frac{1}{2} \times 8\frac{2}{3}$. Do you get the same answer as with Chen's method?
- Tom said he thinks $(3 + \frac{1}{2}) \times (8 + \frac{2}{3}) = 3 \times 8 + \frac{1}{2} \times \frac{2}{3}$.

Is he correct? Explain why or why not.

Show your work. $\boxed{\text{Chen}}$ $- 3 \times 8 + 3 \times \frac{2}{3} + \frac{1}{2} \times 8 + \frac{1}{2} \times \frac{2}{3}$

Use order of operations to solve

$24 + 2 + 4 + \frac{1}{3} = 30\frac{1}{3}$

$\boxed{\text{Margo}}$ $3\frac{1}{2} \times 8\frac{2}{3} = \frac{7}{2} \times \frac{26}{3} = \frac{91}{3} = 30\frac{1}{3}$

$\begin{array}{r} 13 \\ 7 \\ \hline 91 \end{array}$ $\begin{array}{r} 30\frac{1}{3} \\ 3\overline{)91} \\ 9 \\ \hline 6 \end{array}$

Margo and Chen get the same answer.

$\boxed{\text{Tom}}$

No. He didn't multiply the 3 by the $\frac{2}{3}$.
Same problem with the $\frac{1}{2}$.

Level 3 This student shows good understanding of the task and has used correct procedures. Computations are correct. All tasks are completed. The last sentence is unclear.

Name _____ UNIT 3 • TASK A

Fraction Fun

Margo finds the product of $3\frac{1}{2}$ and $8\frac{2}{3}$ by writing each as a fraction and multiplying numerators and denominators.

$3\frac{1}{2} \times 8\frac{2}{3} =$

Chen said he can find the product using the Distributive Property. Here's how he starts:

$3\frac{1}{2} \times 8\frac{2}{3} = (3 + \frac{1}{2}) \times (8 + \frac{2}{3})$

$= 3 \times (8 + \frac{2}{3}) + \frac{1}{2} \times (8 + \frac{2}{3})$ Chen $3 \times 8 + 3 \times \frac{2}{3} + \frac{1}{2} \times 8 + \frac{1}{2} \times \frac{2}{3}$

- Finish Chen's solution to find the answer. $24 + 2 + 4 + \frac{1}{3} = 30\frac{1}{3}$
- Use Margo's method to find $3\frac{1}{2} \times 8\frac{2}{3}$. Do you get the same answer as with Chen's method? Margo $\frac{7}{2} \times \frac{26}{3} = \frac{91}{3} = 30 + \frac{1}{3}$
- Tom said he thinks $(3 + \frac{1}{2}) \times (8 + \frac{2}{3}) = 3 \times 8 + \frac{1}{2} \times \frac{2}{3}$.

Is he correct? Explain why or why not. Tom should look again.

Show your work. $3 \times 30 = 90$ $\begin{array}{r} 13 \\ 7 \\ \hline 91 \end{array}$ $\begin{array}{r} 13 \\ 2\overline{)26} \\ 2 \\ \hline 6 \end{array}$

Level 2 In the first part the student correctly used the Distributive Property. In the second part the calculations are accurate. In the third part the implied answer is "no," but there is no explanation.

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Name _____ UNIT 3 • TASK A

Fraction Fun

Margo finds the product of $3\frac{1}{2}$ and $8\frac{2}{3}$ by writing each as a fraction and multiplying numerators and denominators.

$3\frac{1}{2} \times 8\frac{2}{3} =$

Chen said he can find the product using the Distributive Property. Here's how he starts:

$3\frac{1}{2} \times 8\frac{2}{3} = (3 + \frac{1}{2}) \times (8 + \frac{2}{3})$

$= 3 \times (8 + \frac{2}{3}) + \frac{1}{2} \times (8 + \frac{2}{3})$

- Finish Chen's solution to find the answer.
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- Tom said he thinks $(3 + \frac{1}{2}) \times (8 + \frac{2}{3}) = 3 \times 8 + \frac{1}{2} \times \frac{2}{3}$. Is he correct? Explain why or why not. 30.31 24.33

Show your work.

No toms is not the same because look

$(3+\frac{1}{2})\times(8+\frac{2}{3}) = 3\times 8+\frac{1}{2}\times\frac{2}{3}$

30.31 24.33

They are both different so he is wrong

Level 1 Limited understanding is evidenced. The student has answered only the third part by simply solving both expressions to see if they are equal.

Name _____ UNIT 3 • TASK B

Pen Pal

Assume that you have a pen pal and are going to start writing. This is your first letter. Write a short paragraph describing yourself and your activities.

Include the following in the paragraph:

- How you divide your time during a typical week
- How your school day is divided by classes and other activities
- What you like to do after school

$3\overline{)1.00}$ 0.33 $\frac{1}{3}$ $60\overline{)10.00}$ 0.166 $\frac{1}{6}$ $\frac{60}{400}$ $\frac{360}{40}$

As you write your letter, use fractions or decimals to name parts of classes, hours, days, or weeks. Each time you use a fraction, write the equivalent decimal in parentheses next to it. Do the reverse each time you use a decimal.

Show your work.

Hello Stranger,

It's me, your Pen Pal _____. I'm going to tell you how I divide up my time. Monday-Friday I get up and get ready for school. I take a shower for $\frac{15}{60} = \frac{1}{4}(.25)$ of an hour and get dressed for $\frac{10}{60} = \frac{1}{6} = .17$ of an hour. at school I have English, Math, History, Science, Spanish, Band and lunch. We only have 25 minutes for lunch, $\frac{1}{2}(.5)$ of a regular class. Enough about school! I go home and have a snack and watch TV for $\frac{1}{2}(.5)$ hour. Usually then I practice my trumpet for $\frac{1}{3}(33)$ hour, rest 15 minutes, and back to practice for another $\frac{1}{3} = .33$ hour. We eat and I load the dishwasher, it takes $\frac{1}{4}(.25)$ hour. I study for about 1 hour. and hit the bed. And I start all over again.

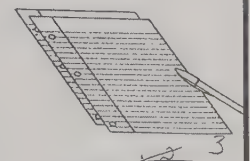
Later,

Level 3 The student effectively integrates fractions and decimals into the letter. School activities and nonschool activities are discussed. Accurate equivalents are given.

Name _____ UNIT 3 • TASK B

Pen Pal

Assume that you have a pen pal and are going to start writing. This is your first letter. Write a short paragraph describing yourself and your activities.



Include the following in the paragraph:

- How you divide your time during a typical week
- How your school day is divided by classes and other activities
- What you like to do after school

$24\overline{)7.00}$ $\frac{48}{22}$

As you write your letter, use fractions or decimals to name parts of classes, hours, days, or weeks. Each time you use a fraction, write the equivalent decimal in parentheses next to it. Do the reverse each time you use a decimal.

Show your work.

Hi Pen Pal,

My name is _____. This is how I spend my time. I spend 7 of 24 hours in school. That's 0.3 $(\frac{7}{24})$ of a day. Each class is around 50 minutes (not always though) so each class is 0.8 ([redacted]) of an hour. I get home at 4:00 p.m. and hang for 1 hour. At 5:00 p.m. I do $\frac{1}{2}$ of my homework until we eat about 6:00 p.m. Of I have a soccer game it takes us $2\frac{3}{4}$ hours to go, play and come home. I sleep for $\frac{8}{24}$ hours, 1 hour more than I go to school. I'll tell you the fun stuff next time!

See ya,

Level 2 A moderate number of fractions (for time) are included. Only one equivalent is given.

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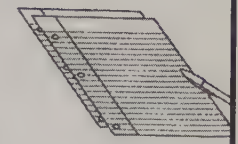
Name _____ UNIT 3 • TASK B

Pen Pal

Assume that you have a pen pal and are going to start writing. This is your first letter. Write a short paragraph describing yourself and your activities.



Include the following in the paragraph:

- How you divide your time during a typical week
- How your school day is divided by classes and other activities
- What you like to do after school

As you write your letter, use fractions or decimals to name parts of classes, hours, days, or weeks. Each time you use a fraction, write the equivalent decimal in parentheses next to it. Do the reverse each time you use a decimal.

Show your work.

1. Hi,
I'm _____. I'm 12 years old I was born in FL. I go to _____. My day is usualy a very uncomplacated day 1/2 of my day is spent at School. My schedule look a little line this: History, Math, English, lunch, Science and the P.E, or Spanish. Then I spend 0.5 of an hour doing work and studing. Then another 25% on sleep. The 25%. left is then spent on play, eat and special activities, Well hope to see you soon
Your new friend,

Level 1 This student conveys only 1/2 day for school, 25% for sleep, and 25% for other activities. Fractions seem to imply a day longer than 24 hours. Equivalents are not given.

TASK A

Horse Sense

Purpose
To assess students' understanding of using equations to solve problems

Time
10–15 minutes

Grouping
Individuals or partners

Introduce the Task
In this task, students are given a one-step equation that can be used to find the amount of money needed to buy a saddle. Once they have solved this equation, they use the solution to answer other questions that can also be done by writing and solving equations. Students must solve addition and multiplication equations. In addition, they must use logical thinking to determine how many hours to work at two different jobs.

TASK B

On the Road

Purpose
To assess students' understanding of reading maps and using the distance formula

Materials
Maps, mileage charts

Time
10–15 minutes

Grouping
Partners or small groups

Time
10–15 minutes

Introduce the Task
Students read maps and mileage charts to plan a trip. They begin by choosing a city or other attraction to visit that is at least 200 mi from their home. Once the city is chosen, students use the map to determine two different routes and use the mileage charts to determine how long each route is. They use the distance formula to determine how long it will take them to travel the routes at different speeds. Students must read a map and use mileage charts, use a formula, and solve one-step equations based on the formula.

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Name _____ Date _____

TASK A

Horse Sense

Performance Indicators	Observations and Rubric Score
_____ Solves a one-step equation to determine the amount of money needed for a saddle. _____ Shows understanding of using the inverse operation to solve equations. _____ Shows understanding of how to write equations to determine earnings. _____ Uses logical reasoning to find how many hours must be worked at each of two jobs to earn a required amount of money.	3 2 1 0

TASK B

On the Road

Performance Indicators	Observations and Rubric Score
_____ Reads a map to plan two routes to visit a city or other attraction of interest. _____ Shows how to use the distance formula to determine travel time to the destination. _____ Uses the distance formula to compare travel times on two routes. _____ Shows work and explains how the answers were determined.	3 2 1 0

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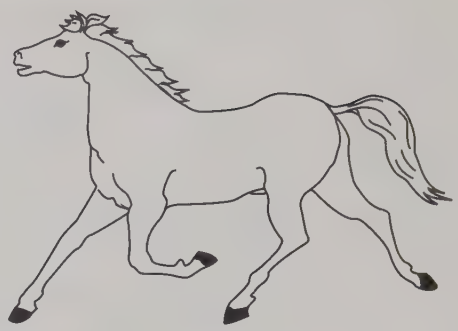
Horse Sense



Alex wants to buy a saddle for his horse. The saddle costs $300. He has $87.25 saved. In addition to keeping his horse at the stable for free, Alex earns $5.25 an hour grooming horses and cleaning out all the stables. He wants to know how many hours he will have to work before he can buy the saddle.

- Alex writes this equation to find the amount of money, *m,* that he needs to buy the saddle.

  $m + \$87.25 = \$300$

Show your work.

- Explain how to use the inverse operation to solve for *m.* Then solve.

- Alex wrote this expression to figure his earnings: $\$5.25 + h$. What mistake did he make?

- How could you find the number of hours Alex needs to work to buy the saddle? How many hours does he need to work?

- Alex has the chance to work at the stable shop. He can work there 2 hours for every 5 hours he works in the stable. Working in the stable shop pays $9.00 per hour. If Alex decides to do this, how many hours must he work at each job to earn enough to pay for the saddle? Explain your reasoning.

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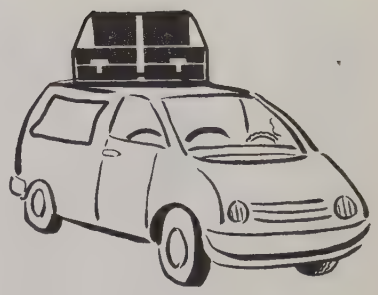
On the Road

Materials: maps, mileage charts

Plan a trip to a city in the United States that is at least 200 miles away from where you live.



Show your work.

- Choose two different routes you can take. Figure out how many miles each route is.

- Show how you would use the distance formula to find the number of hours of driving it would take to reach the city at 55 miles per hour on each of the routes.

- How long would it take to drive to that city at a rate of 65 miles per hour?

- Suppose the speed limit on the longer route is 55 miles per hour and the speed limit on the shorter route is 40 miles per hour. Which route will get you to the city faster?

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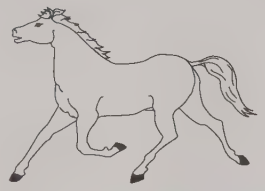
Name _____ UNIT 4 • TASK A

Horse Sense

Alex wants to buy a saddle for his horse. The saddle costs $300. He has $87.25 saved. In addition to keeping his horse at the stable for free, Alex earns $5.25 an hour grooming horses and cleaning out all the stables. He wants to know how many hours he will have to work before he can buy the saddle.



- Alex writes this equation to find the amount of money, m, that he needs to buy the saddle.

  $m + \$87.25 = \$300$

  To solve the equation $m + \$87.25 = \$300$, use the inverse. Because 87.25 is added, you must subtract 87.25:

  $m + 87.25 = 300$

  $m + 87.25 - 87.25 = 300 - 87.25$

  $m = 212.75$

  So, Alex has to earn $212.75.

Show your work.

- Explain how to use the inverse operation to solve for m. Then solve.

  To find earnings, multiply the rate times the number of hours. So, Alex should write $\$5.25 \times h$. You can write the equation $\$5.25 \times h = \$212.75$. To solve, use the inverse of multiplication, or division.

- Alex wrote this expression to figure his earnings: $\$5.25 + h$. What mistake did he make?

  $5.25h = 212.75$

  $\frac{5.25h}{5.25} = \frac{212.75}{5.25}$

  $h = 40.5$

  So, Alex has to work about 41 hr to earn enough to buy the saddle.

- How could you find the number of hours Alex needs to work to buy the saddle? How many hours does he need to work?

  To find how much Alex would earn at two jobs, you would multiply the number of hours at the stable shop by $9 and the number of hours at the stable by $5.25. You also know the hours must be in the ratio of 2 to 5, so you can make a table to solve.

- Alex has the chance to work at the stable shop. He can work there 2 hours for every 5 hours he works in the stable. Working in the stable shop pays $9.00 per hour. If Alex decides to do this, how many hours must he work at each job to earn enough to pay for the saddle? Explain your reasoning.

Hours at Stable Shop	Hours at Stable	Earnings	Total
2	5	$2 \times 9 + 5 \times 5.25$	$44.25
4	10	$4 \times 9 + 10 \times 5.25$	$88.50
6	15	$6 \times 9 + 15 \times 5.25$	$132.75
8	20	$8 \times 9 + 20 \times 5.25$	$177
10	25	$10 \times 9 + 25 \times 5.25$	$221.25

From the table, you can see that Alex must work 10 hours at the stable shop and 25 at the stable.

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Name _____ UNIT 4 • TASK B

On the Road

Materials: maps, mileage charts

Plan a trip to a city in the United States that is at least 200 miles away from where you live.

Show your work.

- Choose two different routes you can take. Figure out how many miles each route is.

  Check students' answers to see if they have determined two different routes to the same place.

- Show how you would use the distance formula to find the number of hours of driving it would take to reach the city at 55 miles per hour on each of the routes.

  To find how long it would take at 55 mi/hr, students should write the total mileage (d) and the rate (55) in the equation $d = rt$ and solve for t by dividing the total mileage by 55.

- How long would it take to drive to that city at a rate of 65 miles per hour?

  To find how long it would take at 65 mi/hr, students should write the total mileage (d) and the rate (65) in the equation $d = rt$ and solve for t by dividing the total mileage by 65.

- Suppose the speed limit on the longer route is 55 miles per hour and the speed limit on the shorter route is 40 miles per hour. Which route will get you to the city faster?

  To find how long it would take to drive the shorter route at 40 mi/hr, students should write the total mileage (d) and the rate (40) in the equation $d = rt$ and solve for t by dividing the total mileage by 40. They should then compare this result to the one obtained for the longer route at 55 mi/hr.

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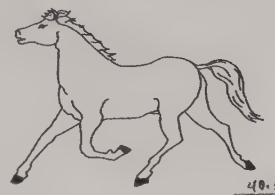
Name _____ UNIT 4 • TASK A

Horse Sense

Alex wants to buy a saddle for his horse. The saddle costs $300. He has $87.25 saved. In addition to keeping his horse at the stable for free, Alex earns $5.25 an hour grooming horses and cleaning out all the stables. He wants to know how many hours he will have to work before he can buy the saddle.



- Alex writes this equation to find the amount of money, *m*, that he needs to buy the saddle.

  $m + \$87.25 = \$300$

Show your work.

- Explain how to use the inverse operation to solve for *m*. Then solve. subtract $87.25 from both sides

  $m + 87.25 - 87.25 = 300 - 87.25$

  $m = 300 - 87.25 = \$212.75$

- Alex wrote this expression to figure his earnings: $5.25 + h$. What mistake did he make?

  He should have multiplied.

- How could you find the number of hours Alex needs to work to buy the saddle? How many hours does he need to work?

  He solves $5.25 \times h = 212.75$ $h = \frac{212.75}{5.25} \approx 40.5$ hours

- Alex has the chance to work at the stable shop. He can work there 2 hours for every 5 hours he works in the stable. Working in the stable shop pays $9.00 per hour. If Alex decides to do this, how many hours must he work at each job to earn enough to pay for the saddle? Explain your reasoning.

  shop: 2×9^{18}, 4×9^{36}, 8×9^{72}, 10×9^{90}

  stable: $5 \times 5.25 = 26.25$, $10 \times 5.25 = 52.50$, $20 \times 5.25 = 105$, $25 \times 5.25 = 131.25$

  He will have a little more than he needs after 10 hours at the shop and 25 hours in the stable. I did this by every time I added 2 to the shop, I added 5 hours to the stable.

Level 3 This student shows a good understanding of the task. All parts of the task are accurate and complete. All work is shown and is accurate.

Name _____ UNIT 4 • TASK A

Horse Sense

Alex wants to buy a saddle for his horse. The saddle costs $300. He has $87.25 saved. In addition to keeping his horse at the stable for free, Alex earns $5.25 an hour grooming horses and cleaning out all the stables. He wants to know how many hours he will have to work before he can buy the saddle.

- Alex writes this equation to find the amount of money, *m*, that he needs to buy the saddle.

  $m + \$87.25 = \$300$

Show your work.

- Explain how to use the inverse operation to solve for *m*. Then solve.

  $300 - 87.25 = m$ $300 - 87.25 = 212.75$ $m = 212.75$

- Alex wrote this expression to figure his earnings: $5.25 + h$. What mistake did he make?

  He forgot to write what it equals

- How could you find the number of hours Alex needs to work to buy the saddle? How many hours does he need to work?

  Divide 212.75 by 5.25 and it equals 41 hrs

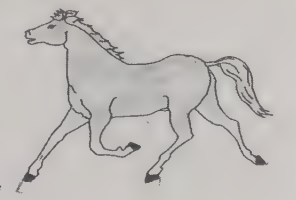
- Alex has the chance to work at the stable shop. He can work there 2 hours for every 5 hours he works in the stable. Working in the stable shop pays $9.00 per hour. If Alex decides to do this, how many hours must he work at each job to earn enough to pay for the saddle? Explain your reasoning.

  10 hrs at stable shop and 25 hrs in the stable

Level 2 This student has done a fairly good job with this task. The first part is correct. The answer in the second part is incorrect. Parts three and four are correct but there is no work shown.

Name _____ UNIT 4 • TASK A

Horse Sense



Alex wants to buy a saddle for his horse. The saddle costs $300. He has $87.25 saved. In addition to keeping his horse at the stable for free, Alex earns $5.25 an hour grooming horses and cleaning out all the stables. He wants to know how many hours he will have to work before he can buy the saddle.

- Alex writes this equation to find the amount of money, *m*, that he needs to buy the saddle.

  $m + \$87.25 = \$300$

Show your work.

- Explain how to use the inverse operation to solve for *m*. Then solve.

_____

- Alex wrote this expression to figure his earnings: $\$5.25 + h$. What mistake did he make?

He is suppost to multiply not add

- How could you find the number of hours Alex needs to work to buy the saddle? How many hours does he need to work?

You have to multiply 5.25 x H

- Alex has the chance to work at the stable shop. He can work there 2 hours for every 5 hours he works in the stable. Working in the stable shop pays $9.00 per hour. If Alex decides to do this, how many hours must he work at each job to earn enough to pay for the saddle? Explain your reasoning.

_____

_____

Level 1 This work displays minimal understanding of the task. The answer for the second part is correct.

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Name _____ UNIT 4 • TASK 8

On the Road

Materials: maps, mileage charts

Plan a trip to a city in the United States that is at least 200 miles away from where you live.

Show your work.

- Choose two different routes you can take. Figure out how many miles each route is.

1 418 miles (2) 556 miles thru Barstow

- Show how you would use the distance formula to find the number of hours of driving it would take to reach the city at 55 miles per hour on each of the routes. $d = rate \times time$ $time = \frac{d}{rate}$

(1) 418 ÷ 55 = 7.6 hours = 7 hours 36 min

(2) 556 ÷ 55 = 10.1 hours = 10 hours 6 min

- How long would it take to drive to that city at a rate of 65 miles per hour?

(1) 418 ÷ 65 = 6.4 hours = 6 hours 24 min

(2) 556 ÷ 65 = 8.6 hours = 8 hours 36 min

- Suppose the speed limit on the longer route is 55 miles per hour and the speed limit on the shorter route is 40 miles per hour. Which route will get you to the city faster?

556 ÷ 55 = 10.1 hours

418 ÷ 40 = 10.5 hours

The longer route is faster by 0.4 of an hour. The longer route is not a whole lot longer.

Level 3 This student shows a good understanding of the requirements of the task. All answers are accurate and complete.

Name _____ UNIT 4 • TASK 8

On the Road

Materials: maps, mileage charts

Plan a trip to a city in the United States that is at least 200 miles away from where you live.

Show your work.

- Choose two different routes you can take. Figure out how many miles each route is.

Route A: 276 miles

Route B: 437 miles - has a sidetrip

- Show how you would use the distance formula to find the number of hours of driving it would take to reach the city at 55 miles per hour on each of the routes. distance = rate × time

Route A: 276 ÷ 55 = 5 hours

Route B: 437 ÷ 55 = 8 hours

- How long would it take to drive to that city at a rate of 65 miles per hour?

Route A: 276 ÷ 65 = 4 hours

Route B: 437 ÷ 65 = 7 hours

- Suppose the speed limit on the longer route is 55 miles per hour and the speed limit on the shorter route is 40 miles per hour. Which route will get you to the city faster?

The shorter route is a lot shorter.

Level 2 Student displays partial understanding of the task. The student applied the distance formula correctly. Because the student rounded all answers, accuracy was lost for 65 mph calculations. The last answer is correct but it is not justified.

Name _____ UNIT 4 • TASK B

On the Road

Materials: maps, mileage charts

Plan a trip to a city in the United States that is at least 200 miles away from where you live.

Show your work.

- Choose two different routes you can take. Figure out how many miles each route is.

397 406

- Show how you would use the distance formula to find the number of hours of driving it would take to reach the city at 55 miles per hour on each of the routes.

Distance = rate × time

397 = 55 × T = 7.218

- How long would it take to drive to that city at a rate of 65 miles per hour?

6.107

- Suppose the speed limit on the longer route is 55 miles per hour and the speed limit on the shorter route is 40 miles per hour. Which route will get you to the city faster?

Sirter rout

Level 1 The response shows limited understanding. The student applied the distance formula correctly by calculating the driving time on the shortest route. The last answer is incorrect. Most of the work is not shown.

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TASK A

On the Border

Purpose
To assess students' understanding of polygons, similar and congruent figures and transformations

Materials
poster board, markers, ruler, compass, straightedge

Time
15–20 minutes

Grouping
Partners or small groups

Introduce the Task
Students create a border for a room using different polygons. Then students use similar and congruent polygons. They also have to use transformations.

TASK B

Lines and Angles

Purpose
To assess students' understanding of classification of angles and plane figures

Materials
Square sheet of paper, straightedge, colored pencils

Time
10–15 minutes

Grouping
Individuals or partners

Preparation Hints
Review the classification of angles and plane figures.

Introduce the Task
Students are asked to create a design of straight lines and then use it to name angles, lines, and plane figures. Students must be able to identify quadrilaterals and triangles; vertical, supplementary, and complementary angles; and parallel, perpendicular, and intersecting lines.

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Name _____ Date _____

TASK A

On the Border

Performance Indicators	Observations and Rubric Score
_____ Creates a design with at least three different polygons, similar and congruent figures, and at least two different transformations. _____ Identifies the figures in the design that are similar and the figures that are congruent and explains how he or she knows. _____ Identifies the types of transformations in the design.	3 2 1 0

TASK B

Lines and Angles

Performance Indicators	Observations and Rubric Score
_____ Identifies and names rectangles, squares, and rhombuses using the vertices. _____ Identifies and names vertical angles, complementary angles, and supplementary angles. _____ Identifies and names parallel lines, perpendicular lines, and intersecting lines. _____ Identifies kinds of triangles, a quadrilateral, and a trapezoid in a picture.	3 2 1 0

Total Score _____/6

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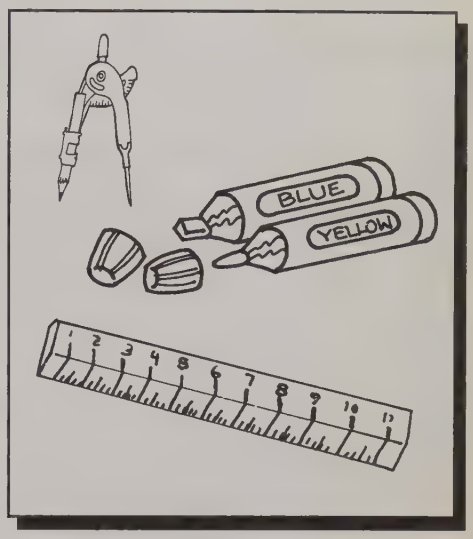
On the Border

Materials: poster board, markers, ruler, compass, straightedge



Mrs. Hansen needs a new border to decorate the walls of her math classroom. She wants student volunteers to make designs on a 1-foot by 3-foot piece of poster board. Each design must show the following:

- at least three different polygons
- similar and congruent figures
- at least two different transformations

a. Make a design for the border. Describe the figures in your design.

Sketch your design.

b. Identify the figures in your design that are similar and the figures that are congruent. Explain how you know.

_____

_____

c. What type of transformations does your design show?

_____

_____

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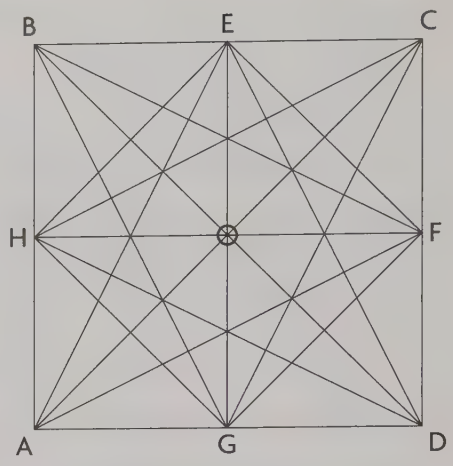
Lines and Angles

Materials: square sheet of paper, straightedge, protractor, colored pencils

Begin with a square sheet of paper. Label the vertices *A, B, C,* and *D,* as shown in the picture at the right. Then fold the square in half and in half again. Open the square and label the middle points *E, F, G,* and *H.* Label the center *O.* Draw lines from these points to every other point on the square, as shown.



- Use letters to name each of these figures that you see in the figure. Add letters to the drawing if needed.

  Rectangle _____

  Square _____

  Rhombus _____

- Name two vertical angles. Measure your angles to check.

  _____

  _____

- Name two complementary angles and two supplementary angles.

  _____

  _____

- Use letters to name parallel lines, perpendicular lines, and intersecting lines.

  _____

  _____

- Find a quadrilateral and a trapezoid using the lines in the square. Color the quadrilateral blue and the trapezoid red. Color an acute triangle green, an obtuse triangle yellow, and a right triangle orange.

  _____

  _____

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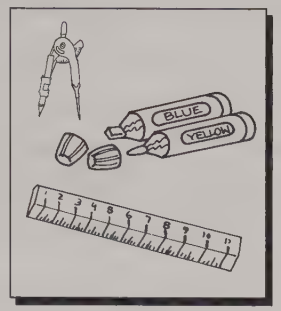
Name _____ UNIT 5 • TASK A

On the Border



Materials: poster board, markers, ruler, compass, straightedge

Mrs. Hansen needs a new border to decorate the walls of her math classroom. She wants student volunteers to make designs on a 1-foot by 3-foot piece of poster board. Each design must show the following:

- at least three different polygons
- similar and congruent figures
- at least two different transformations

a. Make a design for the border. Describe the figures in your design.

Sketch your design.

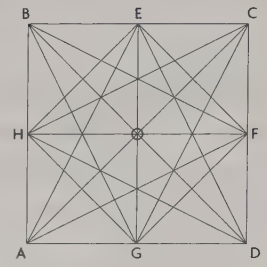
Check students designs for 3 different polygons, similar and congruent figures and at least 2 different transformations.

b. Identify the figures in your design that are similar and the figures that are congruent. Explain how you know.

c. What type of transformations does your design show?

Name _____ UNIT 5 • TASK B

Lines and Angles



Materials: square sheet of paper, straightedge, protractor, colored pencils

Begin with a square sheet of paper. Label the vertices *A, B, C,* and *D,* as shown in the picture at the right. Then fold the square in half and in half again. Open the square and label the middle points *E, F, G,* and *H.* Label the center *O.* Draw lines from these points to every other point on the square, as shown.

- Use letters to name each of these figures that you see in the figure. Add letters to the drawing if needed.

  Check students' answers to see if they have named the desired figure. More than one answer is possible.

  Rectangle — Rectangle: Possible answer, *HBCF*

  Square — Square: Possible answer, *HBEO*

  Rhombus — Rhombus: Possible answer, *EFGH*

- Name two vertical angles. Measure your angles to check.

  Vertical angles: Possible answer, $\angle BOC$ and $\angle AOD$

- Name two complementary angles and two supplementary angles.

  Complementary angles: Possible answer, $\angle HOA$ and $\angle AOG$

  Supplementary angles: Possible answer, $\angle EFC$ and $\angle EFD$

- Use letters to name parallel lines, perpendicular lines, and intersecting lines.

  Parallel lines: Possible answer $\overline{BC}$ and $\overline{AD}$

  Perpendicular lines: Possible answer $\overline{BC}$ and $\overline{BA}$

  Intersecting lines: Possible answer $\overline{BD}$ and $\overline{AC}$

- Find a quadrilateral and a trapezoid using the lines in the square. Color the quadrilateral blue and the trapezoid red. Color an acute triangle green, an obtuse triangle yellow, and a right triangle orange.

  Check students' drawings. A sample solution is given.

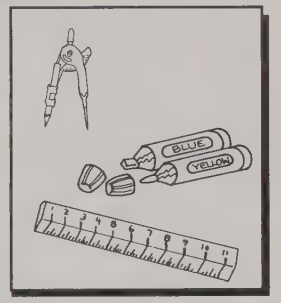
Name _____ UNIT 5 • TASK A

On the Border

Materials: poster board, markers, ruler, compass, straightedge

Mrs. Hansen needs a new border to decorate the walls of her math classroom. She wants student volunteers to make designs on a 1-foot by 3-foot piece of poster board. Each design must show the following:

- at least three different polygons
- similar and congruent figures
- at least two different transformations



a. Make a design for the border. Describe the figures in your design.

Sketch your design.

b. Identify the figures in your design that are similar and the figures that are congruent. Explain how you know.

The similar figures are the triangles because they hve the same shape. The congruent figures are the two circles because they are the same size and shape.

c. What type of transformations does your design show?

I used reflection(rectangles) and I used turn(squares).

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Level 3 This student correctly drew a design including three different polygons. The design contains similar and congruent figures which are explained. Two transformations are identified in the design.

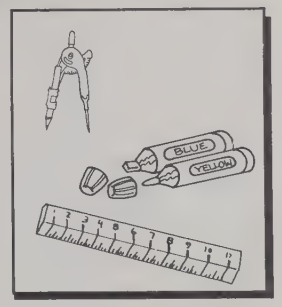
Name _____ UNIT 5 • TASK A

On the Border

Materials: poster board, markers, ruler, compass, straightedge

Mrs. Hansen needs a new border to decorate the walls of her math classroom. She wants student volunteers to make designs on a 1-foot by 3-foot piece of poster board. Each design must show the following:

- at least three different polygons
- similar and congruent figures
- at least two different transformations



a. Make a design for the border. Describe the figures in your design.

Sketch your design.

This would repeat around the room.

I would use a hexagon and I would make a similar one and a rotated one. I would do the same for a rectangle and triangle.

b. Identify the figures in your design that are similar and the figures that are congruent. Explain how you know.

⬡=⬡ similar ▭=▭ similar △=△ similar. I know this because similar is smaller of the same shape and congruent are same size and shape.

c. What type of transformations does your design show?

My design shows rotations. I tilted each one at a little smaller size.

Level 2 This work shows partial understanding. The design includes different polygons and shows similar figures. The work does not contain any congruent figures. Only one transformation is used.

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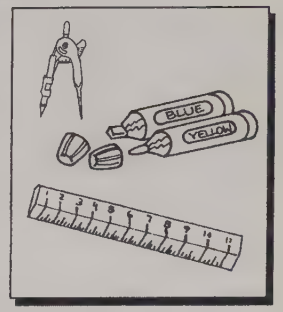
Name _____ UNIT 5 • TASK A

On the Border

Materials: poster board, markers, ruler, compass, straightedge

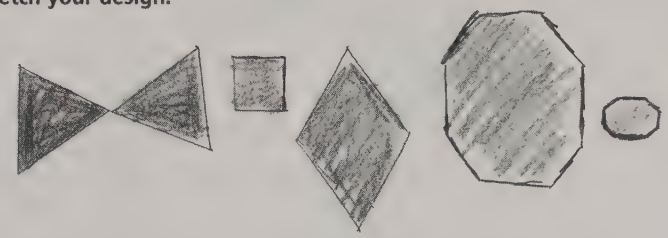


Mrs. Hansen needs a new border to decorate the walls of her math classroom. She wants student volunteers to make designs on a 1-foot by 3-foot piece of poster board. Each design must show the following:

- at least three different polygons
- similar and congruent figures
- at least two different transformations

a. Make a design for the border. Describe the figures in your design.

Sketch your design.



b. Identify the figures in your design that are similar and the figures that are congruent. Explain how you know.

triangle = similair ↓ exact same size and shape square = similair ↓ one is bigger hexagon = similair ↓ are bigger

c. What type of transformations does your design show?

rotation and flip

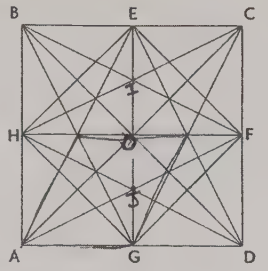
Level 1 The student understands that three polygons must be in the design. The student does not have a clear understanding of similar and congruent. The congruent triangles are labeled similar.

Name _____

UNIT 5 • TASK B

Lines and Angles

Materials: square sheet of paper, straightedge, crayons or colored pencils



Begin with a square sheet of paper. Label the vertices *A*, *B*, *C*, and *D*, as shown in the picture at the right. Then fold the square in half and in half again. Open the square and label the middle points *E*, *F*, *G*, and *H*. Label the center *O*. Draw lines from these points to every other point on the square, as shown.

- Use letters to name each of these figures that you see in the figure. Add letters to the drawing if needed.

Rectangle BAGE, GECD, AHFD, BHFC

Square BEOH, CEOF, AHOG, DGOF, HEFG, ABCD

Rhombus I added two letters - HIFJ

- Name two vertical angles. Measure your angles to check.

∠BOC, ∠COD are both 90°. I checked

- Name two complementary angles and two supplementary angles.

∠HOB and ∠BOE ∠HOC and ∠COF

- Use letters to name parallel lines, perpendicular lines, and intersecting lines.

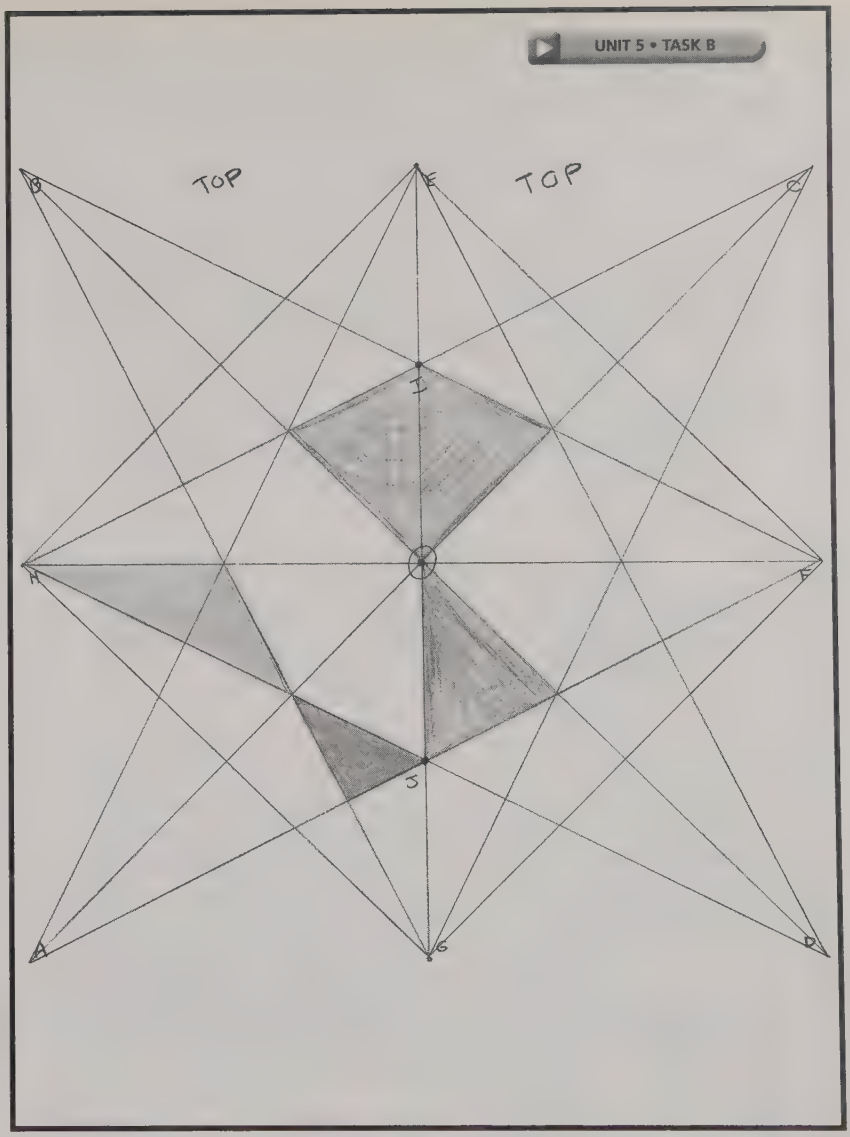
parallel - $\overleftrightarrow{HE}$ and $\overleftrightarrow{GF}$ perpendicular - $\overleftrightarrow{BC}$ and $\overleftrightarrow{CD}$

intersect - $\overleftrightarrow{HC}$ and $\overleftrightarrow{BD}$

- Find a quadrilateral and a trapezoid using the lines in the square. Color the quadrilateral blue and the trapezoid red. Color an acute triangle green, an obtuse triangle yellow, and a right triangle orange.

I did not get the trapezoid

Level 3 This work shows good understanding of lines and figures. Responses are accurate, although this student did not identify every figure.



(Additional page from student sample)

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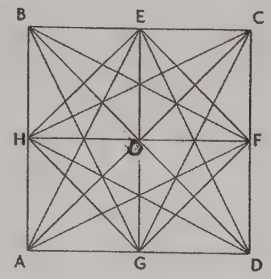
Name _____ UNIT 5 • TASK B

Lines and Angles

Materials: square sheet of paper, straightedge, crayons or colored pencils



Begin with a square sheet of paper. Label the vertices *A*, *B*, *C*, and *D*, as shown in the picture at the right. Then fold the square in half and in half again. Open the square and label the middle points *E*, *F*, *G*, and *H*. Label the center *O*. Draw lines from these points to every other point on the square, as shown.

- Use letters to name each of these figures that you see in the figure. Add letters to the drawing if needed.

Rectangle BHFC, AHFD, BEGA

Square AGOH, ECOF, EFGH

Rhombus ?

- Name two vertical angles. Measure your angles to check.

∠HOE is 90°, ∠BOA 90°

- Name two complementary angles and two supplementary angles.

? make a line

supplementary - HOG & FOG

- Use letters to name parallel lines, perpendicular lines, and intersecting lines.

BA & EG & CD are parallel

BC & EG are perpendicular

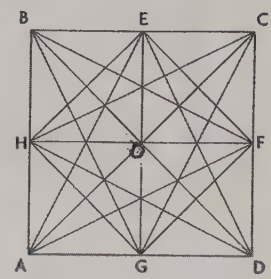
- Find a quadrilateral and a trapezoid using the lines in the square. Color the quadrilateral blue and the trapezoid red. Color an acute triangle green, an obtuse triangle yellow, and a right triangle orange.

Level 2 The work shown is correct but incomplete. Answers given are correct but not all items or components are addressed.

Name _____ UNIT 5 • TASK B

Lines and Angles

Materials: square sheet of paper, straightedge, crayons or colored pencils



Begin with a square sheet of paper. Label the vertices *A*, *B*, *C*, and *D*, as shown in the picture at the right. Then fold the square in half and in half again. Open the square and label the middle points *E*, *F*, *G*, and *H*. Label the center *O*. Draw lines from these points to every other point on the square, as shown.

- Use letters to name each of these figures that you see in the figure. Add letters to the drawing if needed.

Rectangle H,A,D,F) H,B,C,F) E,C,D,G) G,A,B,E)

Square B,a,d,c) a,b,o,g) o,g,d,F) o,e,c,f) o,b,c,b)

Rhombus e,b,g,f

- Name two vertical angles. Measure your angles to check.

∠CA, ∠ed)

- Name two complementary angles and two supplementary angles.

(C,B,A) (H,B,E) (B,O,F) e,b,gf)

- Use letters to name parallel lines, perpendicular lines, and intersecting lines.

H,f e,g intersecting ca b,d: parallel

- Find a quadrilateral and a trapezoid using the lines in the square. Color the quadrilateral blue and the trapezoid red. Color an acute triangle green, an obtuse triangle yellow, and a right triangle orange.

I didn't make the picture.

Level 1 This student correctly identified rectangles and squares. There is misunderstanding of complementary and supplementary angles. The student identifies intersecting lines but not parallel lines.

TASK A

Adding the Trim

Purpose
To assess students' understanding of the formula for the perimeter of a rectangle

Materials
Calculator

Time
10–15 minutes

Grouping
Individuals or partners

Introduce the Task
Students give one formula for the perimeter of a rectangle and then show the steps needed to find the perimeter of a specific rectangle. Then, they are asked to use the Distributive Property to write an equivalent form of the formula.

TASK B

Measuring Up

Purpose
To assess understanding of measuring perimeter using different units of measure

Materials
inch ruler, metric ruler

Time
10–15 minutes

Grouping
Individuals or partners

Introduce the Task
Students are asked to create a figure of their choosing using rectangles, squares, triangles, polygons, or circles. Then, using an inch ruler they are to find its perimeter to the nearest inch. The remaining part of the task asks them to convert to centimeters and measure to the nearest half inch, centimeter, and millimeter. Finally, they are asked to compare these answers. Students must measure segments and use formulas to find perimeter. In so doing, they will add and multiply whole numbers and fractions.

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Name _____ Date _____

TASK A

Adding the Trim

Performance Indicators	Observations and Rubric Score
_____ States one of the possible forms of the perimeter of a rectangle. _____ Uses a calculator to evaluate that form of the formula for a specific rectangle. _____ Uses the Distributive Property to rewrite the formula for perimeter of a rectangle and uses a calculator to evaluate that formula for the same rectangle. _____ Writes a statement comparing and contrasting evaluation of the two formulas using a calculator.	3 2 1 0

TASK B

Measuring Up

Performance Indicators	Observations and Rubric Score
_____ Creates a geometric shape using rectangles, squares, triangles, polygons, or circles. _____ Measures the dimensions of the figure to the nearest inch and calculates the perimeter of the figure. _____ Converts the measured perimeter in inches to centimeters. _____ Measures dimensions in half inches, centimeters, and millimeters, and compares and contrasts the resulting perimeters.	3 2 1 0

Total Score _____/6

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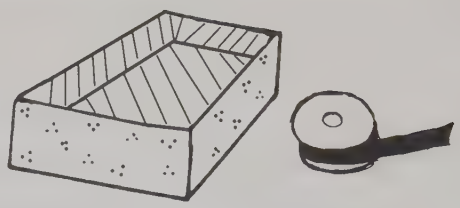
Name _____

Adding the Trim

Materials: calculator



Kate has decorated a box in which to store photos. She wants to trim the top edge of the box with ribbon. To do this Kate needs to find the perimeter of a rectangle with length 8 in. and width 5 in.

- Write the formula for the perimeter of a rectangle.

_____

- Show the steps needed to find the perimeter on a calculator.

Show your work.

- Use the Distributive Property to write the perimeter formula in another form.

_____

- Show the steps needed to find the perimeter using this formula.

_____

_____

- Write a sentence comparing the way you use the two formulas on your calculator.

_____

_____

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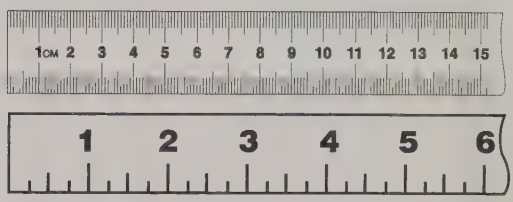
Measuring Up

Materials: inch ruler, metric ruler, plain paper



Draw a composite figure using squares, rectangles, triangles, other polygons, or circles. Draw the figure large enough so you can measure all the dimensions.

- Describe how you formed your figure.

_____

_____

- Measure the dimensions of your figure to the nearest inch. Determine the perimeter of your figure.

_____

- Convert the perimeter measurement to centimeters.

_____

- Measure the dimensions of your figure to the nearest half inch, to the nearest centimeter, and to the nearest millimeter. Complete the table.

Unit	in.	cm (converted)	$\frac{1}{2}$ in.	cm (measured)	mm
Perimeter					

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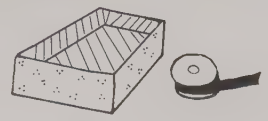
Name _____ UNIT 6 • TASK A

Adding the Trim

Materials: calculator



Kate has decorated a box in which to store photos. She wants to trim the top edge of the box with ribbon. To do this Kate needs to find the perimeter of a rectangle with length 8 in. and width 5 in.

- Write the formula for the perimeter of a rectangle.

_____

- Show the steps needed to find the perimeter on a calculator.

Show your work.

- Use the Distributive Property to write the perimeter formula in another form.

Students may give either the formula $P = 2l + 2w$ or $P = 2(l + w)$. Assuming they give the first one, they should show:

2 [×] 8 [+] 2 [×] 5 [=] 26

- Show the steps needed to find the perimeter using this formula.

(Note: If the calculator does not have algebraic logic, they will have to use the memory keys to get that result.)

Using the Distributive Property gives $P = 2l + 2w = 2(l + w)$. Using this formula, students should show:

8 [+] 5 [−] [×] 2 = 26

- Write a sentence comparing the way you use the two formulas on your calculator.

In comparing the two formulas, students should comment on the ease of using one formula over the other with their calculator.

_____

Name _____ UNIT 6 • TASK B

Measuring Up

Materials: inch ruler, metric ruler, plain paper

Draw a composite figure using squares, rectangles, triangles, other polygons, or circles. Draw the figure large enough so you can measure all the dimensions.

- Describe how you formed your figure.

Students should begin by creating a figure using the suggested shapes. It may help to use grid paper. Students should then mark each part of their figure with the length, measured to the nearest inch.

- Measure the dimensions of your figure to the nearest inch. Determine the perimeter of your figure.

Next, they should find that perimeter in inches and then find the perimeter in centimeters by multiplying by 2.54.

- Convert the perimeter measurement to centimeters.

Next, students should measure the dimensions to the nearest half inch, centimeter, and millimeter, and find the perimeter in each case.

- Measure the dimensions of your figure to the nearest half inch, to the nearest centimeter, and to the nearest millimeter. Complete the table. In comparing and contrasting answers, students should note that the perimeter given in millimeters is the most precise. The measured and calculated answers in centimeters will probably not agree exactly because of rounding errors.

Unit	in.	cm (converted)	$\frac{1}{2}$ in.	cm (measured)	mm
Perimeter					

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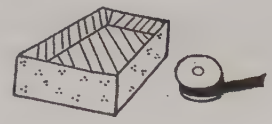
Name _____ UNIT 6 • TASK A

Adding the Trim

Materials: calculator



Kate has decorated a box in which to store photos. She wants to trim the top edge of the box with ribbon. To do this Kate needs to find the perimeter of a rectangle with length 8 in. and width 5 in.

l = 8 w = 5 P = perimeter

- Write the formula for the perimeter of a rectangle.

P = 2l + 2w

- Show the steps needed to find the perimeter on a calculator. 2 × 8 + 2 × 5 = 16 + 10 = 26 inches

Show your work.

2 [×] 8 [=] [M+] 2 [×] 5 [=] [+] [MR] [=]

- Use the Distributive Property to write the perimeter formula in another form.

P = 2(l + w)

- Show the steps needed to find the perimeter using this formula.

8 [+] 5 [=] [×] 2 [=]

- Write a sentence comparing the way you use the two formulas on your calculator.

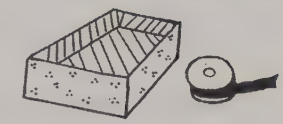
P = 2(l + w) was easier because I didn't have to use the memory keys

Level 3 This work is accurate and complete. Work demonstrates the student's understanding of the task and an understanding of perimeter and using the Distributive Property.

Name _____ UNIT 6 • TASK A

Adding the Trim

Materials: calculator



Kate has decorated a box in which to store photos. She wants to trim the top edge of the box with ribbon. To do this Kate needs to find the perimeter of a rectangle with length 8 in. and width 5 in.

- Write the formula for the perimeter of a rectangle.

perimeter = 2(length + width)
(8, 5)

- Show the steps needed to find the perimeter on a calculator. Easy

Show your work.

8 + 5 = × 2 =

Keys

- Use the Distributive Property to write the perimeter formula in another form. expand

2(length) + 2(width)

- Show the steps needed to find the perimeter using this formula.

2 × 8 then 2 × 5 add

- Write a sentence comparing the way you use the two formulas on your calculator.

I like the first formula better

Level 2 This work displays partial understanding. It shows correct calculator steps and uses the Distributive Property to expand 2l + 2w. However, the calculation steps are incomplete and the comparison is vague.

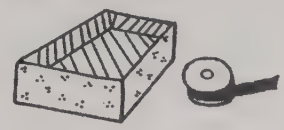
Name _____

UNIT 6 • TASK A

Adding the Trim

Materials: calculator

Kate has decorated a box in which to store photos. She wants to trim the top edge of the box with ribbon. To do this Kate needs to find the perimeter of a rectangle with length 8 in. and width 5 in.



- Write the formula for the perimeter of a rectangle.

  8+8+(5+5)

- Show the steps needed to find the perimeter on a calculator.

Show your work.

press 8 plus 8 plus 5 plus 5

- Use the Distributive Property to write the perimeter formula in another form.

  8X2+(5X2)

- Show the steps needed to find the perimeter using this formula.

- Write a sentence comparing the way you use the two formulas on your calculator.

Level 1 The student understands how to calculate the perimeter of a rectangle but uses the task in a minimal way. Student does not apply the Distributive Property.

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Name _____ UNIT 6 • TASK B

Measuring Up

Materials: inch ruler, metric ruler, plain paper

Draw a composite figure using squares, rectangles, triangles, other polygons, or circles. Draw the figure large enough so you can measure all the dimensions.

Show your work.

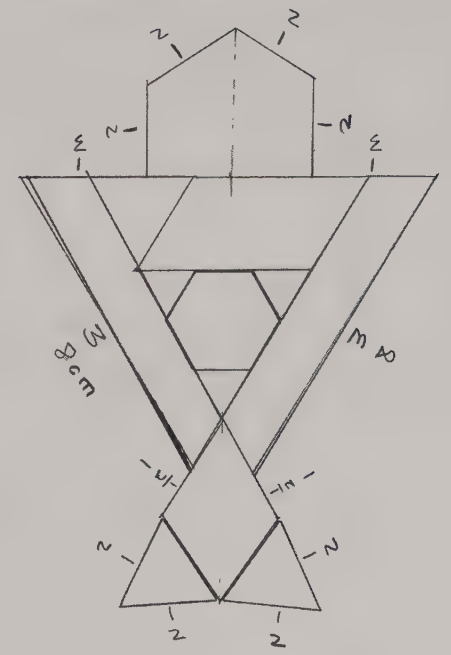
- Describe how you formed your figure.
  I started with the hexagon in the center then drew triangles on three edges. The sides are two long trapizoids, I put a pentagon on top. On bottom a diamond and two triangles.
- Measure the dimensions of your figure to the nearest inch. Determine the perimeter of your figure.
  4 + 2 + 6 + 1 + 4 = 17 inches (the real perimeter is a little smaller)
- Convert the perimeter measurement to centimeters.
  multiply by 2.54 and round 43.2 cm
- Measure the dimensions of your figure to the nearest half inch, to the nearest centimeter, and to the nearest millimeter. Complete the table.

m dm (cm) mm

Unit	in.	cm (converted)	$\frac{1}{2}$ in.	cm (measured)	mm
Perimeter	17	43.2	17	40.0	400

Level 3 The student shows complete understanding of the task. The answers are accurate and complete. The work is shown.

UNIT 6 • TASK B



8 + 6 + 16 + 2 + 8 = 40 cm

(Additional page from student sample)

Name _____ UNIT 6 • TASK B

Measuring Up

Materials: inch ruler, metric ruler, plain paper

Draw a composite figure using squares, rectangles, triangles, other polygons, or circles. Draw the figure large enough so you can measure all the dimensions.

Show your work.

- Describe how you formed your figure.
  I started with the shaded triangle, did a mirror image and drew to the right.
- Measure the dimensions of your figure to the nearest inch. Determine the perimeter of your figure.
  4+2+1+1+2+2+2+1+1+2=18 inches
- Convert the perimeter measurement to centimeters. Use 2.54
  45.7 cm
- Measure the dimensions of your figure to the nearest half inch, to the nearest centimeter, and to the nearest millimeter. Complete the table.

Unit	in.	cm (converted)	$\frac{1}{2}$ in.	cm (measured)	mm
Perimeter	18	45.7			?

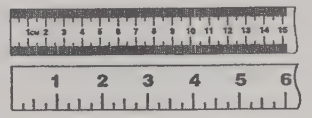
Level 2 Student correctly measured to determine the perimeter, and correctly converted from inches to centimeters. The student did not complete the table and the other measurements.

Name _____ UNIT 6 • TASK B

Measuring Up

Materials: inch ruler, metric ruler, plain paper

Draw a composite figure using squares, rectangles, triangles, other polygons, or circles. Draw the figure large enough so you can measure all the dimensions.



Show your work.

- Describe how you formed your figure.
  I drew a rectale by using my ruler
- Measure the dimensions of your figure to the nearest inch. Determine the perimeter of your figure.
  3 x 4 14
- Convert the perimeter measurement to centimeters.
  34
- Measure the dimensions of your figure to the nearest half inch, to the nearest centimeter, and to the nearest millimeter. Complete the table.

Unit	in.	cm (converted)	$\frac{1}{2}$ in.	cm (measured)	mm
Perimeter	14	34			

Level 1 This response shows minimal attempt to address the task. Figure drawn is not a composite. Correctly measures dimensions and calculates but no work is shown.

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TASK A

Building Blocks

Purpose
To assess students' understanding of solid figures.

Materials
graph paper, solid figure blocks of cubes, triangular prisms and triangular pyramids

Time
15–20 minutes

Grouping
Individuals or partners

Introduce the Task
Students show their understanding of solid figures by naming them and drawing nets.

TASK B

Arts and Crafts Time

Purpose
To assess students' understanding of solid figures and finding measurements of the figures

Materials
graph paper, solid figure blocks: rectangular prisms and cylinders

Time
15–20 minutes

Grouping
Individuals or partners

Introduce the Task
Students use paper to draw nets of solid figures. Then students find the volume and surface area of the solid figures.

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Name _____ Date _____

TASK A

Building Blocks

Performance Indicators	Observations and Rubric Score
_____ Names each solid figure and explains the answer. _____ Draws a net of Figure A and a net of Figure B. _____ Draws a top view, a front view, and a side view of Figure C.	3 2 1 0

TASK B

Arts and Crafts Time

Performance Indicators	Observations and Rubric Score
_____ Draws a net of the box and shades the parts that will be painted. _____ Finds the surface area of the shaded part. _____ Finds the volume of the box and explains the answer. _____ Draws a pattern of the can and shades the parts being painted. _____ Finds the lateral surface area and explains the answer. _____ Determines the amount of space inside the can for storage and explains the answer.	3 2 1 0

Total Score _____/6

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Building Blocks

Constance is teaching her younger brother, Eric, about different solid figures.

Figure A

Figure B

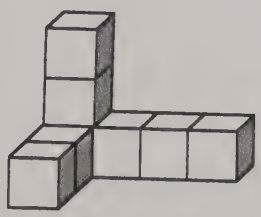

Figure C

a. Constance picks up blocks shaped like Figure A and Figure B. Name each solid figure. Explain your answer.

Figure A _____ **Figure B** _____

Explain your answer. _____

b. On the graph below, draw a net of Figure A and a net of Figure B.

c. How are Figures A and B alike? How are they different?

_____

d. Eric uses cubes to build the solid shown in Figure C. On graph paper, draw a top view, a front view, and a side view for the solid.

Show your work.

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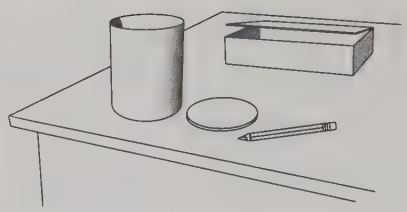
Arts and Crafts Time



Several students are using boxes with flip-tops and cans with snap-on lids to make containers for their art supplies. The boxes are rectangular prisms that are 10 in. long, 6 in. wide, and 4 in. tall. The cans are cylinders that are 8 in. tall with a diameter of 6 in.

a. The students are painting the tops and sides of their boxes. Then they will decorate the boxes with beads. Draw a net of the box. Shade the parts that will be painted. What is the surface area of the part being painted?

b. Some students will keep art supplies inside the boxes. How much space is inside each box to store art supplies. Explain.

c. The students are painting only the lateral surfaces of the cans. Draw a pattern of the can. Shade the parts that will be painted. What is the surface area of the part being painted? Explain. (Use $\pi = 3.14$.)

d. Some students will use the cans to store paintbrushes. How much space is inside each can to store paintbrushes? Explain. (Use $\pi = 3.14$.)

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Name _____ UNIT 7 • TASK A

Building Blocks

Constance is teaching her younger brother, Eric, about different solid figures.

Figure A

Figure B

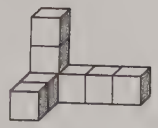


Figure C

a. Constance picks up blocks shaped like Figure A and Figure B. Name each solid figure. Explain your answer.

Figure A triangular prism **Figure B** triangular pyramid

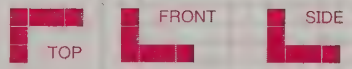
Explain your answer. Figure A is a triangular prism because the faces are rectangles and the bases are triangles. Figure B is a triangular pyramid because all the faces are triangles.

b. On the graph below, draw a net of Figure A and a net of Figure B. Check students' nets.

c. How are Figures A and B alike? How are they different? Answers may vary. Possible answer: Alike: Both solids are polyhedrons. Both have sides that are triangles. Both have triangular views. Different: The lateral faces of the prism are rectangles. All the faces of the pyramid are triangles that have a common vertex.

d. Eric uses cubes to build the solid shown in Figure C. On graph paper, draw a top view, a front view, and a side view for the solid.

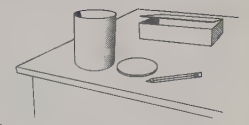
Show your work.



Name _____ UNIT 7 • TASK B

Arts and Crafts Time

Several students are using boxes with flip-tops and cans with snap-on lids to make containers for their art supplies. The boxes are rectangular prisms that are 10 in. long, 6 in. wide, and 4 in. tall. The cans are cylinders that are 8 in. tall with a diameter of 6 in.



a. The students are painting the tops and sides of their boxes. Then they will decorate the boxes with beads. Draw a net of the box. Shade the parts that will be painted. What is the surface area of the part being painted?

b. Some students will keep art supplies inside the boxes. How much space is inside each box to store art supplies. Explain.

c. The students are painting only the lateral surfaces of the cans. Draw a pattern of the can. Shade the parts that will be painted. What is the surface area of the part being painted? Explain. (Use $\pi = 3.14$.)

d. Some students will use the cans to store paintbrushes. How much space is inside each can to store paintbrushes? Explain. (Use $\pi = 3.14$.)

a. Check students' drawings; 188 in.^{2}

b. 240 in.^{3} in each box; volume tells how much space is inside the box, so I used the formula $V = lwh$ to find the volume of each box.

c. Check students' drawings; 150.72 in.^{2}; I used the formula $S = \pi r^2 h$ to find the surface area of the surface.

d. 226.08 in.^{3} in each can; I used the formula $V = \pi r^2 h$ to find the volume.

Name _____ UNIT 7 • TASK A

Building Blocks

Constance is teaching her younger brother, Eric, about different solid figures.

Figure A Figure B Figure C

a. Constance picks up two blocks shaped like Figure A and Figure B. Name each solid figure. Explain your answer.

Figure A triangular prism Figure B triangular pyramid

Explain your answer. Figure A is a triangular prism because it has a top & bottom triangle. Figure B is a triangular pyramid because it has triangle sides.

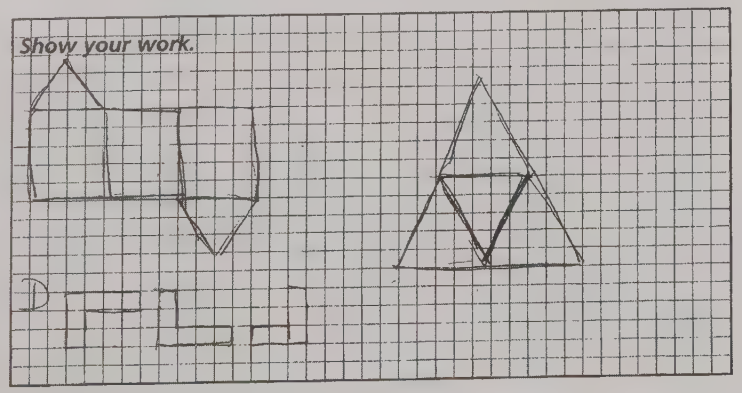
b. On the graph below, draw a net of Figure A and a net of Figure B.

c. How are Figures A and B alike? How are they different?

Figure A & B have triangles, but Figure A has rectangles.

d. Eric uses cubes to build the solid shown in Figure C. On graph paper, draw a top view, a front view, and a side view for the solid.

Show your work.



Level 3 This student displays an understanding of the task. The figures are named correctly and explained. Drawings of each figure are accurate and complete.

Name _____ UNIT 7 • TASK A

Building Blocks

Constance is teaching her younger brother, Eric, about different solid figures.

Figure A Figure B Figure C

a. Constance picks up two blocks shaped like Figure A and Figure B. Name each solid figure. Explain your answer.

Figure A triangular prism Figure B triangular pyramid

Explain your answer. Fig A has triangles as bases. Fig B has only triangles.

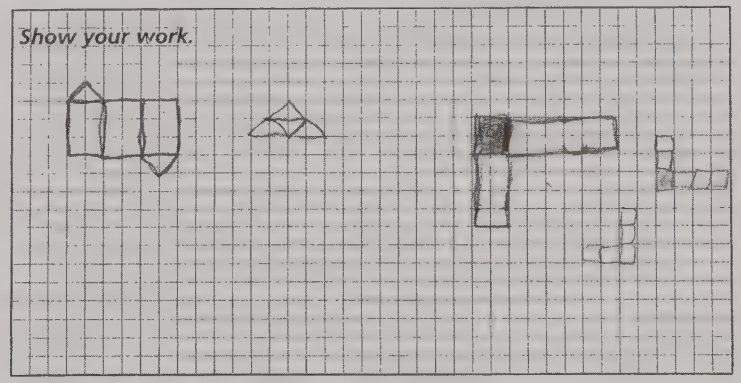
b. On the graph below, draw a net of Figure A and a net of Figure B.

c. How are Figures A and B alike? How are they different?

The both have triangles, Fig a has rectangles Fig B does not.

d. Eric uses cubes to build the solid shown in Figure C. On graph paper, draw a top view, a front view, and a side view for the solid.

Show your work.



Level 2 This student displays some understanding of the task. Figures A and B are named, explained, and drawn accurately. However, the drawings of Figure C are not labeled and one view is incorrect.

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Name _____ UNIT 7 • TASK A

Building Blocks

Constance is teaching her younger brother, Eric, about different solid figures.

Figure A **Figure B** **Figure C**

a. Constance picks up two blocks shaped like Figure A and Figure B. Name each solid figure. Explain your answer.

Figure A triangular prisim **Figure B** tryangular pyrimid

Explain your answer. (Figure A) the tryangular prism has tryangular bases, (Figure B) the pyrimid comes together at the top and only has 1 base.

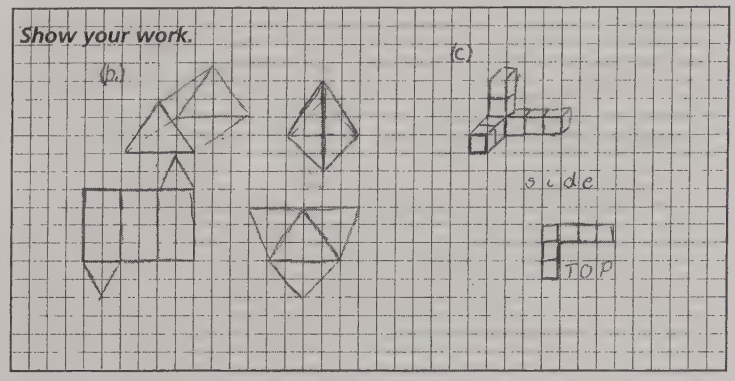
b. On the graph below, draw a net of Figure A and a net of Figure B.

c. How are Figures A and B alike? How are they different?

/

d. Eric uses cubes to build the solid shown in Figure C. On graph paper, draw a top view, a front view, and a side view for the solid.

Show your work.

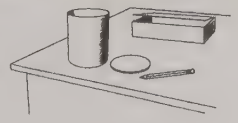


Level 1 This student displays some understanding, but the work is incomplete.

Name _____ UNIT 7 • TASK B

Arts and Crafts Time

Several students are using flip-top boxes and cans with snap-on lids to make containers for their art supplies. The boxes are rectangular prisms that are 10 in. long, 6 in. wide, and 4 in. tall. The cans are cylinders that are 8 in. tall with a diameter of 6 in.

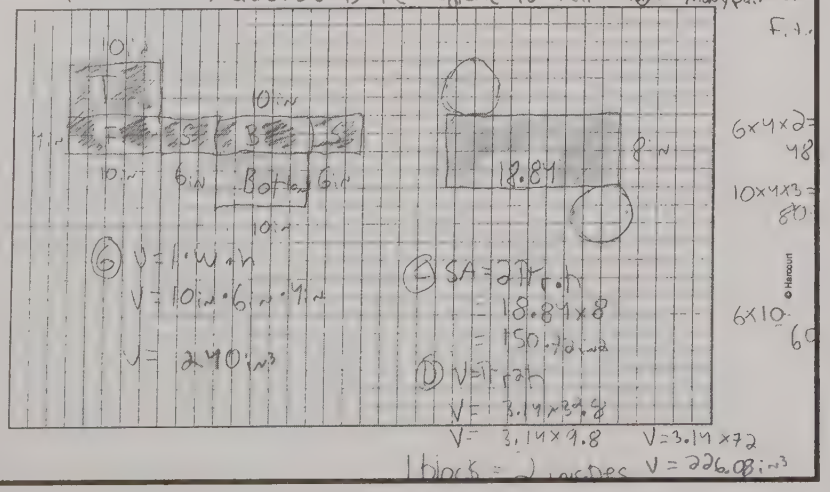


a. The students are painting the tops and sides of their boxes. Then they will decorate the boxes with beads. Draw a net of the box. Shade the parts that will be painted. What is the surface area of the part being painted? 188 in^2

b. Some students will keep art supplies inside the boxes. How much space is inside each box to store art supplies. Explain.
240 in^3 is the lenght times the width times height.

c. The students are painting only the lateral surface of the cans. Draw a pattern of the can. Shade the parts that will be painted. What is the surface area of the part being painted? Explain. (Use $\pi = 3.14$.)
150.72 in^2 Lenghth times height to get the answer.

d. Some students will use the cans to store paintbrushes. How much space is inside each can to store paintbrushes? Explain. (Use $\pi = 3.14$.) 226.08 is the volume to tell how many paintbrushes

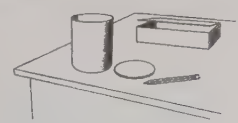


Level 3 This student shows a good understanding of the task. All parts of the task are accurate and complete. The work is shown and explained.

Name _____ UNIT 7 • TASK B

Arts and Crafts Time

Several students are using flip-top boxes and cans with snap-on lids to make containers for their art supplies. The boxes are rectangular prisms that are 10 in. long, 6 in. wide, and 4 in. tall. The cans are cylinders that are 8 in. tall with a diameter of 6 in.

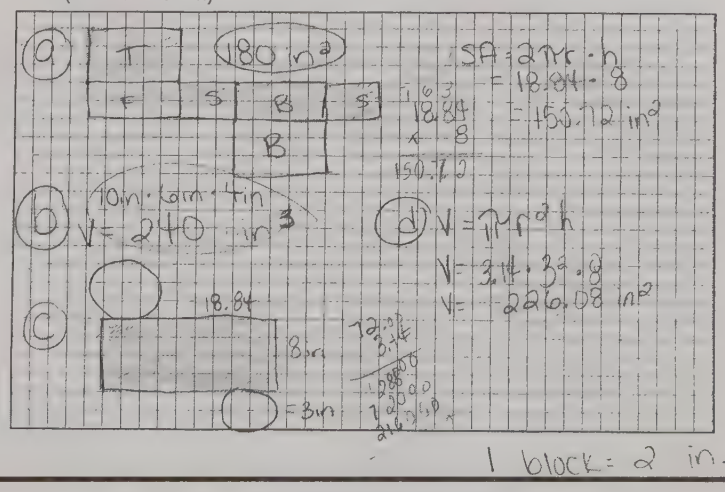


a. The students are painting the tops and sides of their boxes. Then they will decorate the boxes with beads. Draw a net of the box. Shade the parts that will be painted. What is the surface area of the part being painted?

b. Some students will keep art supplies inside the boxes. How much space is inside each box to store art supplies. Explain.

c. The students are painting only the lateral surface of the cans. Draw a pattern of the can. Shade the parts that will be painted. What is the surface area of the part being painted? Explain. (Use $\pi = 3.14$.)

d. Some students will use the cans to store paintbrushes. How much space is inside each can to store paintbrushes? Explain. (Use $\pi = 3.14$.)



Level 2 This student seems to have a good understanding of the task. However, the surface area is incorrect. Although work is shown, none of the answers are explained.

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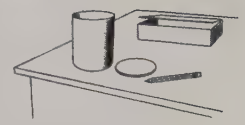
Name _____ UNIT 7 • TASK B

Arts and Crafts Time

Several students are using flip-top boxes and cans with snap-on lids to make containers for their art supplies. The boxes are rectangular prisms that are 10 in. long, 6 in. wide, and 4 in. tall. The cans are cylinders that are 8 in. tall with a diameter of 6 in.

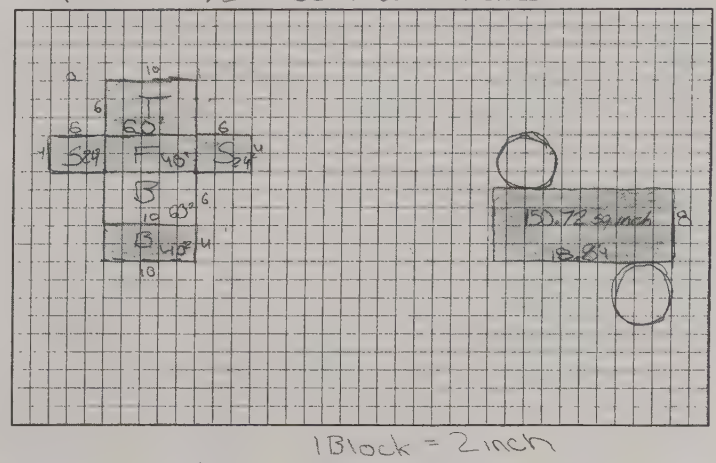


a. The students are painting the tops and sides of their boxes. Then they will decorate the boxes with beads. Draw a net of the box. Shade the parts that will be painted. What is the surface area of the part being painted?

b. Some students will keep art supplies inside the boxes. How much space is inside each box to store art supplies. Explain. 240 cubic inches

c. The students are painting only the lateral surface of the cans. Draw a pattern of the can. Shade the parts that will be painted. What is the surface area of the part being painted? Explain. (Use $\pi = 3.14$.)

d. Some students will use the cans to store paintbrushes. How much space is inside each can to store paintbrushes? Explain. (Use $\pi = 3.14$.) 226.08 in^3 cubic inches



1 Block = 2 inch

Level 1 This response shows limited understanding. The student accurately drew and shaded the nets and calculated the volumes correctly. The student did not calculate the surface area or provide explanations

TASK A

A Taxing Decision

Purpose
To assess students' understanding of using percents.

Materials (optional)
Calculator

Time
10–15 minutes

Grouping
Individuals or partners

Preparation Hints
Review finding percent of a number and the percent one number is of another.

Introduce the Task
Students are asked to find the rate of sales tax for items given the sales tax and the price of an item. Then, they use that rate to find sales tax on other items. Finally, they are asked to find how much sale items will cost with sales tax included.

TASK B

A Hairy Exercise

Purpose
To assess students' understanding of collecting, analyzing, and displaying data

Materials (optional)
Compass, protractor

Time
10–15 minutes

Grouping
Individuals or partners

Preparation Hints
Discuss how to make a circle graph and review finding what percent one number is of another.

Introduce the Task
Students will need to find what percent one number is of another, collect data, and display the data in a circle graph. In addition, they will extrapolate from that data to predict hair color in the school population as a whole.

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Name _____ Date _____

TASK A

A Taxing Decision

Performance Indicators	Observations and Rubric Score
_____ Determines the sales tax rate given the amount of sales tax and the cost of the item. _____ Uses the sales tax rate to determine sales tax on other items. _____ Calculates sale price and total price, including sales tax. _____ Shows work and explains how the answers were determined.	3 2 1 0

TASK B

A Hairy Exercise

Performance Indicators	Observations and Rubric Score
_____ Collects data about hair color from other students in the class _____ Calculates percent of students having each hair color. _____ Uses data to make a circle graph showing hair color of students in the class. _____ Extrapolates from given data to predict hair color in the entire school.	3 2 1 0

Total Score _____ /6

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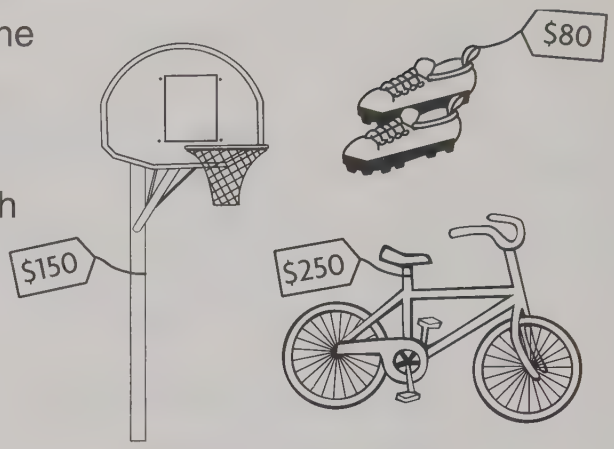
Name _____

A Taxing Decision

James and his friends are shopping at the mall. They are browsing at the sporting goods store and wondering if they could buy any of these items. Then they remember that there is sales tax on each item. Help James and his friends find the total cost of the items plus tax.



The sales tax on the bicycle is $15.

- Find the rate of sales tax.

_____

_____

- At the same rate, find the sales tax on the two other items.

_____

_____

- If all bikes go on sale at 10% off and shoes are 5% off, how much will two bikes and two pairs of shoes cost, sales tax included?

_____

_____

- Describe how to use your calculator to find the total cost of the bikes and the shoes.

_____

_____

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A Hairy Exercise

Collect data from the students in your class. Don't forget to include yourself. Complete the table to show the number of students with each hair color.

Hair Color	Number of Students
Black	
Brown	
Red	
Blond	
Other	

- Calculate the percent of students with each hair color.
- Make a circle graph to show the results of your survey.
- Find out how many students there are in your school. How many students would you expect to have each hair color?

Show your work.

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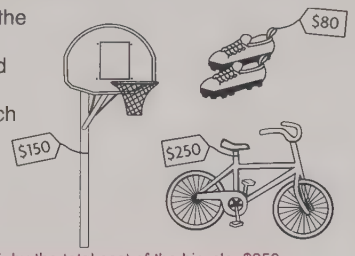
Name _____ UNIT 8 • TASK A

A Taxing Decision

James and his friends are shopping at the mall. They are browsing at the sporting goods store and wondering if they could buy any of these items. Then they remember that there is sales tax on each item. Help James and his friends find the total cost of the items plus tax.



The sales tax on the bicycle is $15.

- Find the rate of sales tax.

To find the rate of sales tax, divide the tax, $15, by the total cost of the bicycle, $250:
15 ÷ 250 = 0.06 = 6%

- At the same rate, find the sales tax on the two other items.

The sales tax on the basketball stand is $150 · 6% = $150 · 0.06 = $9. The sales tax on the soccer shoes is $80 × 6% = $80 × 0.06 = $4.80.

- If all bikes go on sale at 10% off and shoes are 5% off, how much will two bikes and two pairs of shoes cost, sales tax included?

At 10% off, the bikes cost $250 − $250 × 10% = $250 − $25 = $225. At 5% off, the shoes cost $80 − $80 × 0.05 = $80 − $4 = $76

Two bikes	$450
Two pairs of shoes	$152
	$602
Sales tax: $602 × 6% =	$ 36.12
Total:	$638.12

- Describe how to use your calculator to find the total cost of the bikes and the shoes.

One possible solution is
250 [×] 2 [M+] 80 [−] 5 [%] [×] 2 [M+] [MR] [+] 6[%] 638.12
[T.S. bracketed symbols are calculator keys.]

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Name _____ UNIT 8 • TASK B

A Hairy Exercise

Collect data from the students in your class. Don't forget to include yourself. Complete the table to show the number of students with each hair color.

Hair Color	Number of Students
Black	
Brown	
Red	
Blond	
Other	

- Calculate the percent of students with each hair color.
- Make a circle graph to show the results of your survey.
- Find out how many students there are in your school. How many students would you expect to have each hair color?

Show your work.

Students should tally and then write the number of students with each hair color. Check their answers.
Next, they should divide each number in the table by the total number of students surveyed. Suggest they round to the nearest whole percent. Due to rounding, the total may not be 100%.
To find the number of degrees in each sector of the circle, multiply each percent by 360°. Then, they should draw a circle with a compass and measure each central angle around the center of the circle. Remind them to label each segment and title the graph.
Students may reason that the proportion of each hair color in the school would be roughly the same as in their class, so they can multiply the number of students by each percent to predict the number of students in the school with each hair color.

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Model Student Papers for
A Taxing Decision

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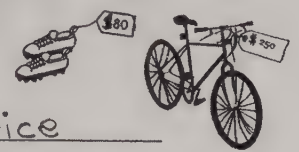
Name _____ UNIT 8 • TASK A

A Taxing Decision

James and his friends are shopping at the mall. They are browsing at the sporting goods store and wondering if they could buy any of these items. Then they remember that there is sales tax on each item. Help James and his friends find the total cost of the items plus tax.

$250\overline{)15.00}$ = .06; 15 00; 0

250 × 5 = 1250



The sales tax on the bicycle is $15.

- Find the rate of sales tax.

TaxRate = tax amount ÷ price

15 ÷ 250 = 0.06 same as 6%

- At the same rate, find the sales tax on the two other items.

150 × .06 = 9.00; 80 × .06 = 4.80

basketball hoop - 150 x .06 = $9.00

sports shoes - 80 x .06 = $4.80

- If all bikes go on sale at 10% off and shoes are 5% off, how much will two bikes and two pairs of shoes cost, sales tax included?

225 × .06 = 350

bike - 10% off 250 - move decimal, $25

shoes - .05 x 80 = $4.00 off | 225 x 2 = 450

76 x 2 = 152 | Total: $602 x .06 = 36.12 + 602 = $638.12

- Describe how to use your calculator to find the total cost of the bikes and the shoes. (= parenthesis key) = parenthesis key

key key to m call uals key

(250 - 25) x 2 = + (80 - 4) x 2 = + 6% =

Another way:

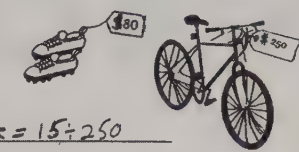
250 - 25 = x 2 = m+ 80 - 4 = x 2 = m+ mR + 6%

Level 3 The first three parts are accurate and complete. In the last part the student does not do the calculation but indicates the keystrokes necessary to perform the calculations.

Name _____ UNIT 8 • TASK A

A Taxing Decision

James and his friends are shopping at the mall. They are browsing at the sporting goods store and wondering if they could buy any of these items. Then they remember that there is sales tax on each item. Help James and his friends find the total cost of the items plus tax.



The sales tax on the bicycle is $15.

- Find the rate of sales tax.

$15 = 250 x tax rate tax rate = 15 ÷ 250

250 = 1000; 250 = 500; $250\overline{)15.00}$ = .06

- At the same rate, find the sales tax on the two other items.

hoop: $150 x .06 = $9.00

cleets: $80 x .06 = $4.80

- If all bikes go on sale at 10% off and shoes are 5% off, how much will two bikes and two pairs of shoes cost, sales tax included?

1/10 of $250 = $25 off bikes - cost $225

.05 x 80 = $4.00 off shoes - cost $76

You save $29.00 total

- Describe how to use your calculator to find the total cost of the bikes and the shoes.

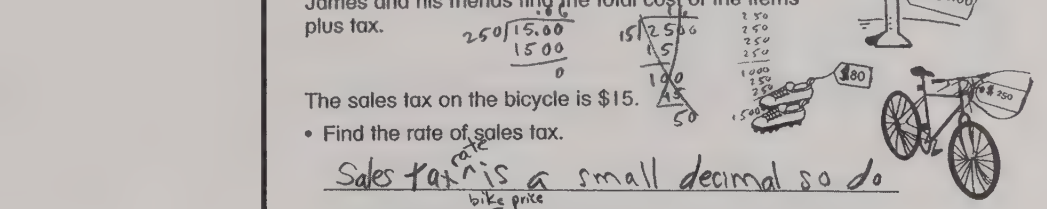
You just use it

Level 2 First and second parts are correct and complete although student never refers to tax rate as a percent. Third part is only half done and fourth part is not helpful.

Name _____ UNIT 8 • TASK A

A Taxing Decision

James and his friends are shopping at the mall. They are browsing at the sporting goods store and wondering if they could buy any of these items. Then they remember that there is sales tax on each item. Help James and his friends find the total cost of the items plus tax.



The sales tax on the bicycle is $15.

- Find the rate of sales tax.

Sales tax rate is a small decimal so do
15 ÷ 250 = 0.06
bike price

- At the same rate, find the sales tax on the two other items.

It's 60% for all the toys

- If all bikes go on sale at 10% off and shoes are 5% off, how much will two bikes and two pairs of shoes cost, sales tax included?

- Describe how to use your calculator to find the total cost of the bikes and the shoes.

Level 1 A minimal response is provided. The first part is correct, but student seems to misunderstand the rest of the task.

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Name _____ UNIT 8 • TASK B

A Hairy Exercise

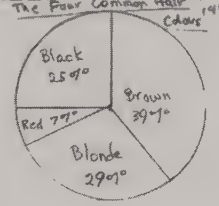
Collect data from the students in your class. Don't forget to include yourself. Complete the table to show the number of students with each hair color.

Hair Color	Number of Students
Black	25%
Brown	39%
Red	7%
Blond	29%
Other	none 0%

- Calculate the percent of students with each hair color.
- Make a circle graph to show the results of your survey.
- Find out how many students there are in your school. How many students would you expect to have each hair color?

Show your work.

Percent of Students with The Four Common Hair Colors



I used my calculator to calculate the angles.

My teacher says we have 800 (about) students in our school. About one quarter might have Black hair — 200 kids. About 40% Brown — 320 kids. About 30% Blond — 240 kids. About 7% Red — 56 kids. I rounded to multiply in my head. So the numbers are a little big. They are just predictions.

Level 3 This student shows understanding of the task. Data is collected and percentages are accurately calculated. Circle graph is accurate and a title is included. Student makes a good prediction.

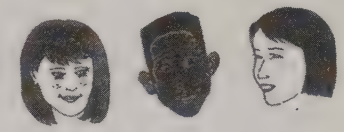
Name _____ UNIT 8 • TASK B

A Hairy Exercise

Collect data from the students in your class. Don't forget to include yourself. Complete the table to show the number of students with each hair color.

Hair Color	Number of Students
Black	7
Brown	8
Red	2
Blond	8
Other ?	25

(2 absent)

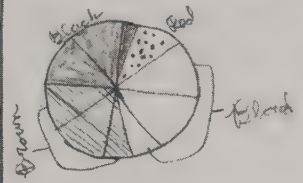


- Calculate the percent of students with each hair color.
- Make a circle graph to show the results of your survey.
- Find out how many students there are in your school. How many students would you expect to have each hair color?

Show your work.

Black: $\frac{7}{25} = .28 = 28\%$ Brown: $\frac{8}{25} = .32 = 32\%$

Red: $\frac{2}{25} = .08 = 8\%$ Blond: $\frac{8}{25} = 32\%$



I divided into $\frac{1}{8}$ pieces and figured out how much to mark.

I think there are about 600 at my school. We can't color our hair weird colors so we all have these four colors.

Level 2 Data collection and percentage calculation are accurate and complete. Circle graph shows logical thinking. No prediction was made about whole school population.

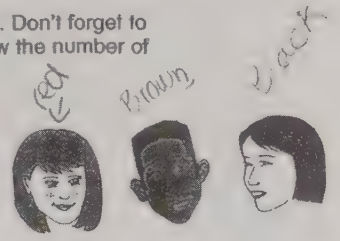
Name _____

UNIT 8 • TASK B

A Hairy Exercise

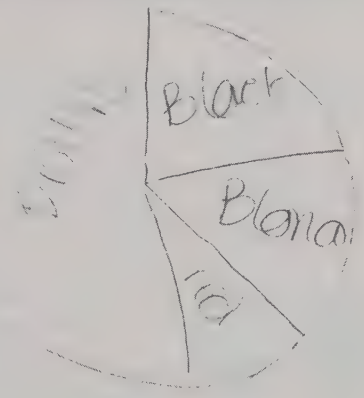
Collect data from the students in your class. Don't forget to include yourself. Complete the table to show the number of students with each hair color.

Hair Color	Number of Students
Black	11
Brown	11
Red	1
Blond	111
Other	



- Calculate the percent of students with each hair color.
- Make a circle graph to show the results of your survey.
- Find out how many students there are in your school. How many students would you expect to have each hair color?

Show your work.



Level 1 The work is incomplete. The student conducted the survey and recorded the results in a tally table. No percentages were determined. No prediction is made.

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TASK A

Waterfall Hike

Purpose
To assess students' understanding of function tables and graphs

Materials
Graph paper

Time
15–20 minutes

Grouping
Individuals or partners

Introduce the Task
Students are asked to complete a function table and make a prediction based on the table. Students then sketch graphs and explain if the graphs show linear or nonlinear relationships.

TASK B

Transformations

Purpose
To assess students' understanding of transformations on a coordinate plane

Time
10–15 minutes

Grouping
Individuals or partners

Preparation Hints
Review translations, reflections, and rotations and graphing of points on a coordinate plane.

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Introduce the Task
Students are asked to graph two sets of points on a coordinate plane and then determine how the figures are related. Then, they are asked to draw transformations and combinations of a quadrilateral graphed on the coordinate plane. Students must graph points on a coordinate grid and recognize transformations on the coordinate grid.

Name _____ Date _____

TASK A

Waterfall Hike

Performance Indicators	Observations and Rubric Score
_____ Completes the function table and sketches the graph of the function. _____ Explains how to use the graph to predict how long it will take to hike 11 m and calculate the time. _____ Graphs the progress of the hike for each hour of each day. _____ Explains if the graphs represent linear relationships or nonlinear relationships.	3 2 1 0

TASK B

Transformations

Performance Indicators	Observations and Rubric Score
_____ Plots points on a coordinate grid. _____ Plots points on a coordinate grid and identifies the transformation of the first quadrilateral that gives this one. _____ Draws a single translation of the first quadrilateral and gives the vertices of the new quadrilateral. _____ Draws a transformation that is a combination of two of translation, rotation, and reflection, and identifies a similar transformation designed by someone else.	3 2 1 0

Total Score _____ /6

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Waterfall Hike

Materials: graph paper

The Blake family is going on a three-day hiking and camping trip to see their favorite waterfall. The function $y = 2x$ shows the number of miles, y, that the Blakes hike in x hours.

a. Complete the function table below. Use the function table to sketch the graph of $y = 2x$ on the graph paper below.

hours, *x*	0	1	2	3	4
miles, *y*	0	2			

b. Explain how to use the graph to predict how long it will take the Blakes to hike 11 m. About how long will it take?

c. The Blakes hiked for 3 hr the first day, 5 hr the second day, and 6 hr the third day. Sketch a graph below that shows their progress each hour for the third day.

d. Do the graphs show linear relationships or nonlinear relationships? Explain.

a. **c.**

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Name _____

Transformations

Show your work.

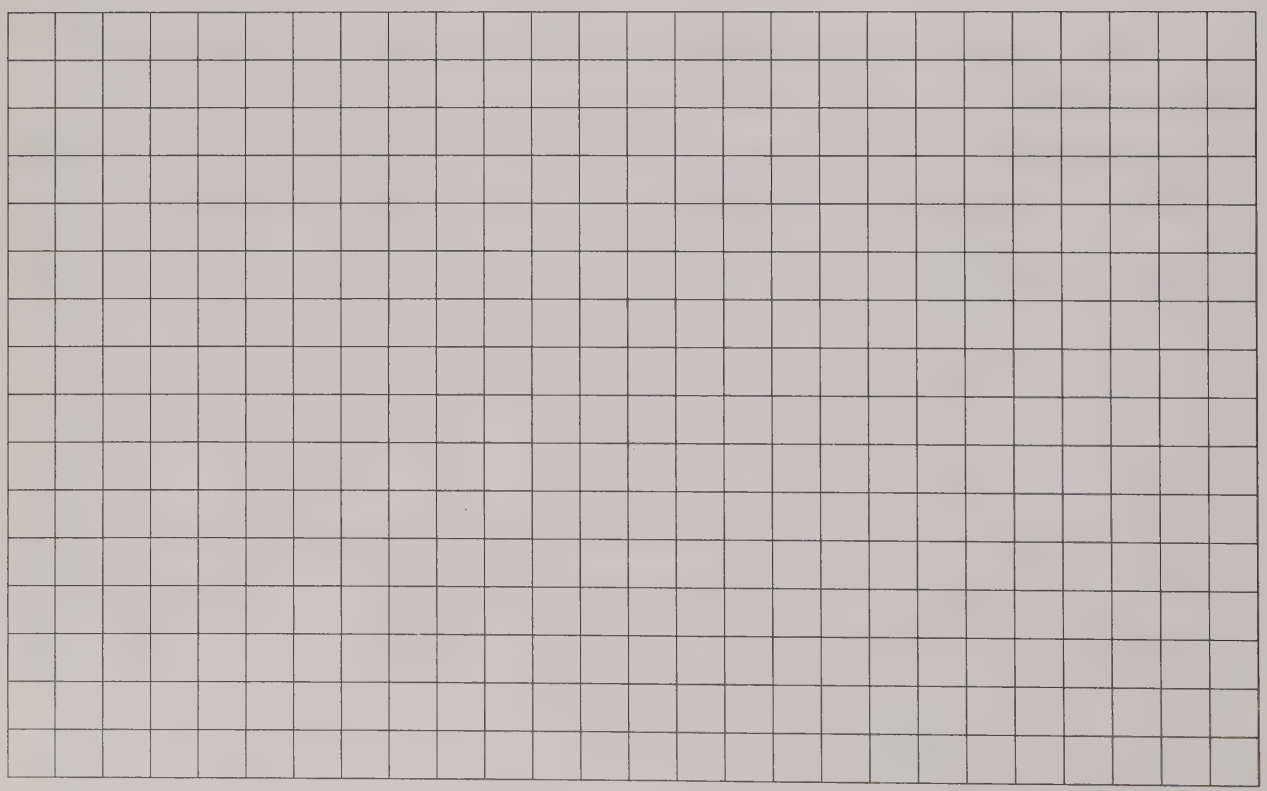
- Graph the *x* and *y*-axes on the graph paper. Then graph the points (0,2), (8,0), (0,$^{-}$4), and ($^{-}$4,0) and connect them in order so that the result is a quadrilateral.
- Draw the quadrilateral with vertices ($^{-}$4,0), ($^{-}$8,2), ($^{-}$16,0), and ($^{-}$8,$^{-}$4). Is this transformation a rotation, translation, or reflection of the first quadrilateral?

_____

- Draw a translation of the first quadrilateral. Give the new coordinates of the vertices.

_____

- Draw a transformation that is a combination of rotation and translation, rotation and reflection, or translation and reflection. Exchange drawings with a classmate and determine which two transformations he or she has used.



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Name _____ UNIT 9 • TASK A

Waterfall Hike

Materials: graph paper

The Blake family is going on a three-day hiking and camping trip to see their favorite waterfall. The function $y = 2x$ shows the number of miles, y, that the Blakes hike in x hours.

a. Complete the function table below. Use the function table to sketch the graph of $y = 2x$ on the graph paper below. Check students' graphs.

hours, *x*	0	1	2	3	4
miles, *y*	0	2			

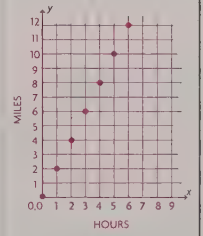
b. Explain how to use the graph to predict how long it will take the Blakes to hike 11 m. About how long will it take? Possible answer: Extend the graph and then find the value of x that corresponds to $y = 11$. It will take about 5.5 hr.

c. The Blakes hiked for 3 hr the first day, 5 hr the second day, and 6 hr the third day. Sketch a graph below that shows their progress each hour for the third day.

d. Do the graphs show linear relationships or nonlinear relationships? Explain. Linear; the graphs are straight lines.

a.

c.



Name _____ UNIT 9 • TASK B

Transformations

Show your work.

- Graph the x and y-axes on the graph paper. Then graph the points (0,2), (8,0), (0,$^{-}$4), and ($^{-}$4,0) and connect them in order so that the result is a quadrilateral.
- Draw the quadrilateral with vertices ($^{-}$4,0), ($^{-}$8,2), ($^{-}$16,0), and ($^{-}$8,$^{-}$4). Is this transformation a rotation, translation, or reflection of the first quadrilateral?

When students have graphed both sets of coordinates and connected them to form two quadrilaterals, they should observe that the second figure is a reflection over the line $x = {}^{-}4$. It can also be described as a 180° rotation around the point ($^{-}$4,0).

- Draw a translation of the first quadrilateral. Give the new coordinates of the vertices. Check students' answers to see if their new quadrilaterals are translations. In each case, the same number should be added to or subtracted from each x-coordinate and the same number (not necessarily the same one as with the x-coordinates) should be added to or subtracted from the y-coordinates.
- Draw a transformation that is a combination of rotation and translation, rotation and reflection, or translation and reflection. Exchange drawings with a classmate and determine which two transformations he or she has used.

Check students' drawings to see that they have combined a rotation and translation, rotation and reflection, or translation and reflection.

Name _____ UNIT 9 • TASK A

Waterfall Hike

Materials: graph paper

The Blake family is going on a three-day hiking and camping trip to see their favorite waterfall. The function $y = 2x$ shows the number of miles, y, that the Blakes hike in x hours.

a. Complete the function table below. Use the function table to sketch the graph of $y = 2x$ on the graph paper below.

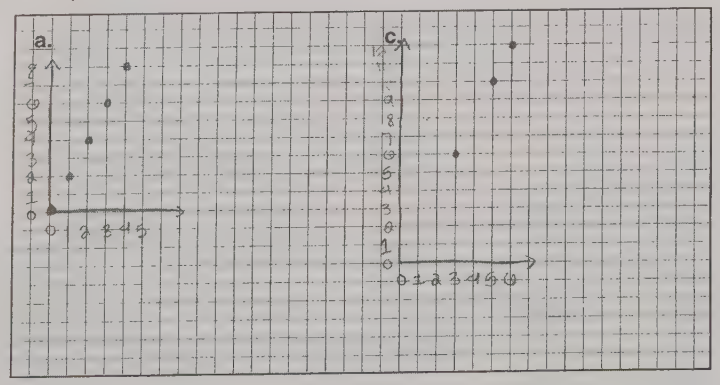
hours, x	0	1	2	3	4
miles, y	0	2	4	6	8

b. Explain how to use the graph to predict how long it will take the Blakes to hike 11 m. About how long will it take? To see how long it will take Blake to hike 11 mi you divide it by 2 because thu the equation is y=2x. The answer is 5½ hours.

c. The Blakes hiked for 3 hr the first day, 5 hr the second day, and 6 hr the third day. Sketch a graph below that shows their progress each hour for the third day.

x	3	5	6
y	6	10	12

d. Do the graphs show linear relationships or nonlinear relationships? Explain. Linear, because we see a line.



Level 3 This paper shows a good understanding of function tables and linear relationships. Explanations and graphs are clear and accurate.

Name _____ UNIT 9 • TASK A

Waterfall Hike

Materials: graph paper

The Blake family is going on a three-day hiking and camping trip to see their favorite waterfall. The function $y = 2x$ shows the number of miles, y, that the Blakes hike in x hours.

a. Complete the function table below. Use the function table to sketch the graph of $y = 2x$ on the graph paper below.

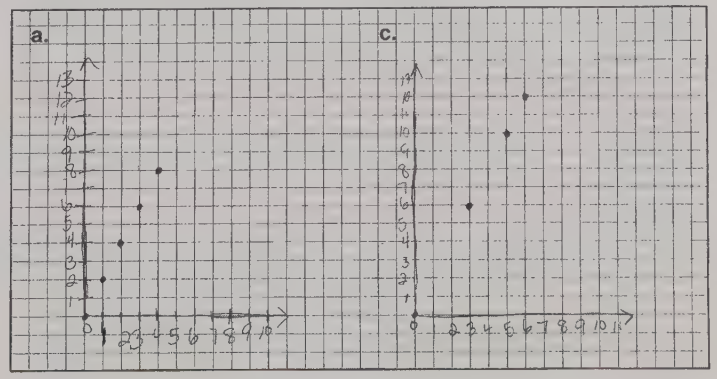
hours, x	0	1	2	3	4
miles, y	0	2	4	6	8

b. Explain how to use the graph to predict how long it will take the Blakes to hike 11 mi. About how long will it take? 5.5 hours

c. The Blakes hiked for 3 hr the first day, 5 hr the second day, and 6 hr the third day. Sketch a graph below that shows their progress each hour for the third day.

x	3	5	6
y	6	10	12

d. Do the graphs show linear relationships or nonlinear relationships? Explain. Because we see a linear line.



Level 2 This paper shows a good understanding of the task. However, the student did not explain how the graph was used to predict the time to hike 11 miles.

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Name _____ UNIT 9 • TASK A

Waterfall Hike

Materials: graph paper

The Blake family is going on a three-day hiking and camping trip to see their favorite waterfall. The function $y = 2x$ shows the number of miles, y, that the Blakes hike in x hours.

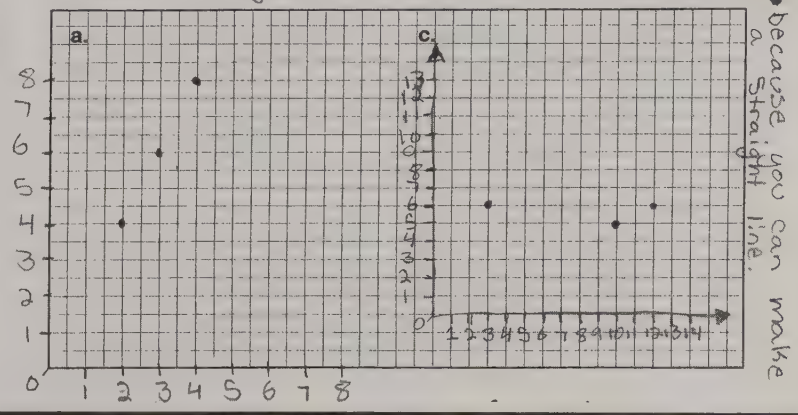
a. Complete the function table below. Use the function table to sketch the graph of $y = 2x$ on the graph paper below.

hours, x	0	1	2	3	4
miles, y	0	2	4	6	8

b. Explain how to use the graph to predict how long it will take the Blakes to hike 11 m. About how long will it take? It will take about 22 miles.

c. The Blakes hiked for 3 hr the first day, 5 hr the second day, and 6 hr the third day. Sketch a graph below that shows their progress each hour for the third day.

d. Do the graphs show linear relationships or nonlinear relationships? Explain. The graphs show linear relationships because you can make a straight line.



Level 1 This response shows partial understanding of the task and it is incomplete.

Name _____ UNIT 9 • TASK B

Transformations

Show your work.

a. • Graph the *x* and *y*- axes on the graph paper. Then graph the points (0, 2), (8, 0), (0, $^{-}4$), and ($^{-}4$, 0) and connect them in order so that the result is a quadrilateral.

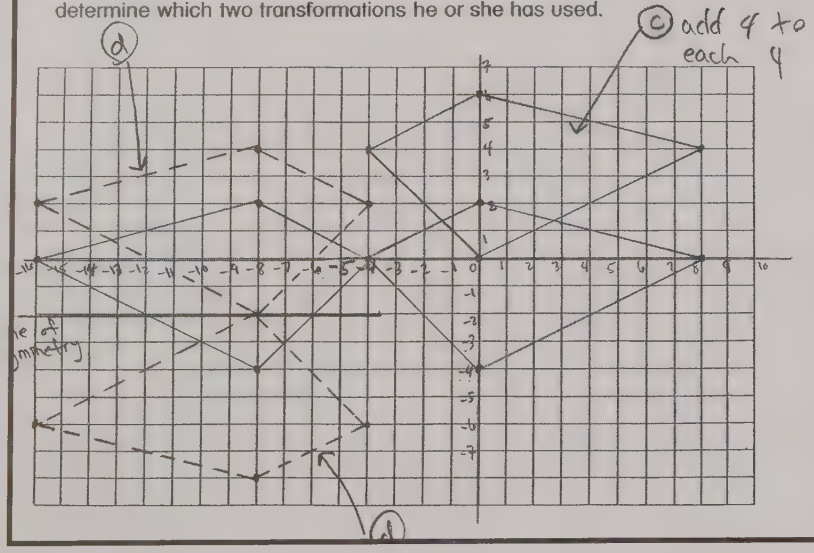
b. • Draw the quadrilateral with vertices ($^{-}4$, 0), ($^{-}8$, 2), ($^{-}16$, 0), and ($^{-}8$, $^{-}4$). Is this transformation a rotation, translation, or reflection of the first quadrilateral?

I would say a reflection across the vertical line thru the x point -4.

c. • Draw a translation of the first quadrilateral. Give the new coordinates of the vertices.

(-4,4) (0,0) (0,6) (8,4)

d. • Draw a transformation that is a combination of rotation and translation, rotation and reflection, or translation and reflection. Exchange drawings with a classmate and determine which two transformations he or she has used.



Level 3 Student demonstrates good understanding of the task. Responses are accurate and complete and nicely labeled.

Name _____ UNIT 9 • TASK B

Transformations

Show your work.

• Graph the *x* and *y*- axes on the graph paper. Then graph the points (0, 2), (8, 0), (0, $^{-}4$), and ($^{-}4$, 0) and connect them in order so that the result is a quadrilateral.

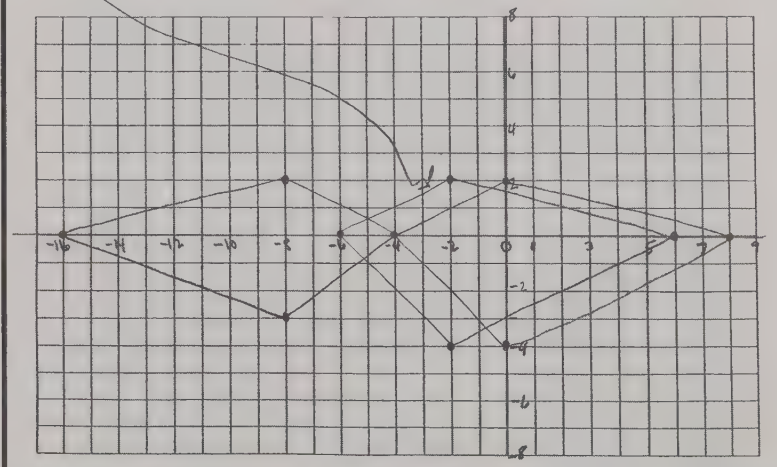
• Draw the quadrilateral with vertices ($^{-}4$, 0), ($^{-}8$, 2), ($^{-}16$, 0), and ($^{-}8$, $^{-}4$). Is this transformation a rotation, translation, or reflection of the first quadrilateral?

rotation

• Draw a translation of the first quadrilateral. Give the new coordinates of the vertices.

move to the left by 2

• Draw a transformation that is a combination of rotation and translation, rotation and reflection, or translation and reflection. Exchange drawings with a classmate and determine which two transformations he or she has used.



Level 2 This student used an appropriate coordinate system and plotted the first quadrilateral accurately. Student made an error in plotting reflection and did not give the ordered pairs for the quadrilateral.

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Name _____ UNIT 9 • TASK B

Transformations

Show your work.

- Graph the x and y- axes on the graph paper. Then graph the points (0, 2), (8, 0), (0, $^{-}4$), and ($^{-}4$, 0) and connect them in order so that the result is a quadrilateral.
- Draw the quadrilateral with vertices ($^{-}4$, 0), ($^{-}8$, 2), ($^{-}16$, 0), and ($^{-}8$, $^{-}4$). Is this transformation a rotation, translation, or reflection of the first quadrilateral?

translation

- Draw a translation of the first quadrilateral. Give the new coordinates of the vertices.

- Draw a transformation that is a combination of rotation and translation, rotation and reflection, or translation and reflection. Exchange drawings with a classmate and determine which two transformations he or she has used.

Level 1 This student supplied a limited response. First quadrilateral was plotted but with faulty coordinate system. This prevents plotting of the second quadrilateral correctly. The answer given in second part is not correct.

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CAT: Math Text.

AUTHOR Harcourt

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